



This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

- + *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.
- + *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.
- + *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.
- + *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at <http://books.google.com/>

COMMONWEALTH CLUB
OF CALIFORNIA

UNIVERSITY OF CALIFORNIA, SANTA CRUZ



3 2106 00080 9795

Practical Experience With the
Work Week of Forty-Eight
Hours or Less

HB

31

N3

NO. 32

Research Report Number 32
December, 1920

THE UNIVERSITY LIBRARY

OCT 30 1971

UNIVERSITY OF CALIFORNIA
SANTA CRUZ

National Industrial
Conference Board

National Industrial Conference Board

10 EAST 39TH STREET, NEW YORK

BRANCH OFFICE

SOUTHERN BUILDING, WASHINGTON, D. C.

THE National Industrial Conference Board is a co-operative body composed of representatives of national and state industrial associations, and of closely allied engineering societies of a national character, and is organized to provide a clearing house of information, a forum for constructive discussion, and machinery for co-operative action on matters that vitally affect the industrial development of the nation.

FREDERICK P. FISH
LOYALL A. OSBORNE
ALBERT G. DUNCAN
MAGNUS W. ALEXANDER

Chairman
Vice-Chairman
Treasurer
Managing Director

AFFILIATED ORGANIZATIONS

AMERICAN COTTON MANUFACTURERS' ASSOCIATION
AMERICAN ELECTRIC RAILWAY ASSOCIATION
AMERICAN HARDWARE MANUFACTURERS' ASSOCIATION
AMERICAN MALLEABLE CASTINGS ASSOCIATION
AMERICAN PAPER AND PULP ASSOCIATION
ELECTRICAL MANUFACTURERS' CLUB
INSTITUTE OF MAKERS OF EXPLOSIVES
MANUFACTURING CHEMISTS' ASSOCIATION OF THE U. S.
NATIONAL ASSOCIATION OF COTTON MANUFACTURERS
NATIONAL ASSOCIATION OF FINISHERS OF COTTON FABRICS
NATIONAL ASSOCIATION OF MANUFACTURERS
NATIONAL ASSOCIATION OF WOOL MANUFACTURERS
NATIONAL AUTOMOBILE CHAMBER OF COMMERCE
NATIONAL BOOT AND SHOE MANUFACTURERS' ASSOCIATION
NATIONAL ELECTRIC LIGHT ASSOCIATION
NATIONAL ERECTORS' ASSOCIATION
NATIONAL FOUNDERS' ASSOCIATION
NATIONAL IMPLEMENT AND VEHICLE ASSOCIATION
NATIONAL INDUSTRIAL COUNCIL
NATIONAL METAL TRADES ASSOCIATION
RUBBER ASSOCIATION OF AMERICA, INC.
THE AMERICAN PIG IRON ASSOCIATION
THE RAILWAY CAR MANUFACTURERS' ASSOCIATION
THE SILK ASSOCIATION OF AMERICA
TOBACCO MERCHANTS' ASSOCIATION OF THE UNITED STATES
UNITED TYPOTHETÆ OF AMERICA

ASSOCIATED INDUSTRIES OF MASSACHUSETTS
ASSOCIATED INDUSTRIES OF NEW YORK STATE, INC.
ILLINOIS MANUFACTURERS' ASSOCIATION
MANUFACTURERS' ASSOCIATION OF CONNECTICUT, INC.

**PRACTICAL EXPERIENCE WITH THE
WORK WEEK OF FORTY-EIGHT
HOURS OR LESS**

**RESEARCH REPORT NUMBER 32
DECEMBER, 1920**

**NATIONAL INDUSTRIAL CONFERENCE BOARD
10 EAST 39TH STREET
NEW YORK**

COPYRIGHT 1921
NATIONAL INDUSTRIAL CONFERENCE BOARD

Foreword

THE current importance of the hours-of-work problem arising out of present industrial conditions gives timely interest to a study of the collective experience of manufacturers under reduced hours of work.

This report presents the results of an investigation by the National Industrial Conference Board into the experience of American manufacturers, mainly those in whose establishments the weekly work schedule has been reduced to 48 hours or less since the beginning of 1919. It is supplementary to the earlier reports on the hours-of-work problem by the Board, but differs in that the latter were not limited to any special work schedules. The data here presented have been recently collected, and all unnecessary repetition of the general discussions in the Board's earlier reports on this subject is avoided.

CONTENTS

	PAGE
I. INTRODUCTION	1
Statement of Problem	1
Scope and Method of Investigation	3
Basis of the Report	4
Work-week Schedules	5
II. SUMMARY OF FINDINGS	7
General Conclusions	7
Effect of Other Factors on Output.....	9
Changes in Output by Industries	12
Experience in Great Britain	16
III. COTTON MANUFACTURING	17
Changes in Work-week Schedules.....	17
Changes in Output Accompanying Reduction in Hours	17
Analysis of Changes in Output	18
Conclusions for Cotton Manufacturing.....	22
General Opinion on Length of Work Week....	22
IV. WOOL MANUFACTURING	25
Changes in Work-week Schedules.....	25
Changes in Output Accompanying Reduction in Hours	25
Analysis of Changes in Output	26
Conclusions for Wool Manufacturing.....	31
General Opinion on Length of Work Week....	31
V. SILK MANUFACTURING	33
Changes in Work-week Schedules.....	33
Changes in Output Accompanying Reduction in Hours	33
Analysis of Changes in Output	36
Conclusions for Silk Manufacturing.....	38
General Opinion on Length of Work Week....	39

CONTENTS—*Continued*

	PAGE
VI. BOOT AND SHOE MANUFACTURING	41
Changes in Work-week Schedules.....	41
Changes in Output Accompanying Reduction in Hours	41
Analysis of Changes in Output	44
Conclusions for Boot and Shoe Manufacturing	52
General Opinion on Length of Work Week....	53
VII. METAL MANUFACTURING	55
Changes in Work-week Schedules.....	55
Changes in Output Accompanying Reduction in Hours	55
Analysis of Changes in Output	58
Conclusions for Metal Manufacturing.....	68
General Opinion on Length of Work Week....	69
VIII. MISCELLANEOUS MANUFACTURING INDUSTRIES....	73
Changes in Work-week Schedules.....	73
Changes in Output Accompanying Reduction in Hours	74
Analysis of Changes in Output	77
Conclusions for Miscellaneous Industries....	85
General Opinion on Length of Work Week....	86

LIST OF NUMBERED TABLES

	PAGE
TABLE 1: Comparison of Changes in Weekly Output per Worker Accompanying Reduction to a Schedule of 48 Hours or Less in Various Manufacturing Industries.	13
TABLE 2: Cotton Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 48-Hour Schedule.....	18
TABLE 3: Wool Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 48-Hour Schedule.....	26
TABLE 4: Silk Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a Week of 48 Hours or Less.....	34
TABLE 5: Silk Manufacturing: Changes in Weekly Output per Worker Accompanying Reductions to a 48-Hour Schedule.....	35
TABLE 6: Silk Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 44-Hour Schedule.....	35
TABLE 7: Boot and Shoe Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a Weekly Schedule of 48 Hours or Less.....	42
TABLE 8: Boot and Shoe Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 48-Hour Schedule.....	43
TABLE 9: Boot and Shoe Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 45-Hour Schedule.....	43
TABLE 10: Boot and Shoe Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 44-Hour Schedule.....	44
TABLE 11: Metal Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a Week of 48 Hours or Less.....	56

LIST OF NUMBERED TABLES—*Continued*

	PAGE
TABLE 12: Metal Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 48-Hour Schedule.....	57
TABLE 13: Metal Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 45-Hour Schedule.....	57
TABLE 14: Metal Manufacturing: Changes in Weekly Output per Worker Accompanying Reduction to a 44-Hour Schedule.....	58
TABLE 15: Miscellaneous Manufacturing Industries: Changes in Weekly Output per Worker Accompanying Reduction to a Week of 48 Hours or Less.....	75
TABLE 16: Miscellaneous Manufacturing Industries: Changes in Weekly Output per Worker Accompanying Reduction to a 48-Hour Schedule.....	75
TABLE 17: Miscellaneous Manufacturing Industries: Changes in Weekly Output per Worker Accompanying Reduction to a 45-Hour Schedule.....	76
TABLE 18: Miscellaneous Manufacturing Industries: Changes in Weekly Output per Worker Accompanying Reduction to a 44-Hour Schedule.....	76

LIST OF DIAGRAMS

	PAGE
DIAGRAM 1: Changes in Weekly Output Per Worker Accompanying Reduction to a Week of 48 Hours or Less in Manufacturing Industries.....	7
DIAGRAM 2: Changes in Weekly Output Per Worker Accompanying Reduction to a Week of 48 Hours or Less for Individual Manufacturing Industries.....	14
DIAGRAM 3: Changes in Weekly Output Per Worker Accompanying a Reduction to a Week of 48 Hours or Less: Cotton Manufacturing.....	18
DIAGRAM 4: Changes in Weekly Output Per Worker Accompanying a Reduction to a Week of 48 Hours or Less: Wool Manufacturing.....	26
DIAGRAM 5: Changes in Weekly Output Per Worker Accompanying a Reduction to a Week of 48 Hours or Less: Silk Manufacturing.....	34
DIAGRAM 6: Changes in Weekly Output Per Worker Accompanying a Reduction to a Week of 48 Hours or Less: Boot and Shoe Manufacturing.....	42
DIAGRAM 7: Changes in Weekly Output Per Worker Accompanying a Reduction to a Week of 48 Hours or Less: Metal Manufacturing.....	56
DIAGRAM 8: Changes in Weekly Output Per Worker Accompanying a Reduction to a Week of 48 Hours or Less: Miscellaneous Manufacturing Industries.....	74

Practical Experience With The Work Week of Forty-eight Hours or Less

I

INTRODUCTION

This report carries forward the Conference Board's earlier studies dealing with the hours-of-work problem.¹ The data secured in this investigation cover the experience of manufacturers extending over varying periods, but most of the information was received by the Board between March and June, 1920. In practically all of the cases included in this study the short work schedule had been in operation during a period of more than six months.

STATEMENT OF PROBLEM

The problem before the Board in the present investigation of experience with a work week of 48 hours or less in manufacturing industries was to determine whether or not such a schedule would yield the same, or practically the same, weekly

¹ The following reports on the subject of hours of work have been issued by the National Industrial Conference Board:

Research Report No. 4. Hours of Work as Related to Output and Health of Workers, Cotton Manufacturing, March, 1918:

Research Report No. 7. Hours of Work as Related to Output and Health of Workers, Boot and Shoe Industry, June, 1918:

Research Report No. 12. Hours of Work as Related to Output and Health of Workers, Wool Manufacturing, December, 1918:

Research Report No. 16. Hours of Work as Related to Output and Health of Workers, Silk Manufacturing, March, 1919:

Research Report No. 18. Hours of Work as Related to Output and Health of Workers, Metal Manufacturing, March, 1919:

Research Report No. 27. The Hours-of-Work Problem in Five Major Industries, March, 1920.

output per worker as the previous longer schedules in the same plants and under substantially similar conditions. It was also desired to ascertain what, if any, were the effects of such change in work hours upon the quality of production and upon the health and morale of the workers.

It must be noted at the outset that in almost every case this reduction to a 48-hour week or less was the latest in two or more reductions extending over a period of years, and that this study is concerned only with the ability of a plant to maintain weekly production at the level existing under the schedule of hours which immediately preceded. Many plants working on longer schedules may have been able, for instance, to maintain production after a reduction to a 54-hour week, though unable to keep up that same output on reducing to a 48-hour week or less. Other establishments, in which production may have been materially decreased by reducing to a 50-hour week, may now be able to maintain the same output in 48 as in 50 hours per week.

In studying output data, careful discrimination must be made between hourly and weekly output. Obviously, when working time is reduced, there may be an increase in the hourly output, while the total weekly output may nevertheless fall below the previous level.

The problem of measuring the effects of a reduction in working time is exceedingly complicated. The time element is only one factor among many and cannot be wholly isolated from the large number of others, all of which may have a bearing upon output. To arrive at sound conclusions, therefore, it is necessary to recognize all of the factors involved and to consider them in connection with the reduction in working time.

Among the factors which may affect production, collateral to the number of hours worked, are: the character of the work performed; wages and systems of wage payment; personnel of the workers; and changes in processes, equipment, material, style, or in methods of management or in management itself. The attitude of the workers and local labor conditions are also important considerations.

SCOPE AND METHOD

The data for this report were obtained by questionnaires designed to bring out all the important facts relating to experience with the work week of 48 hours or less. These questionnaires were sent out to practically all those establishments in the major manufacturing industries which the Board was able to find were operating on such schedules. The replies received were checked by correspondence and by field work where necessary. The material secured by the Board was based in the greater part on the production records of the reporting establishments. In some cases, however, the statements were expressions of judgment, or at least individual interpretations of the records and conditions.

In this investigation, estimates of the ability of a plant to maintain production were, in general, based upon nominal rather than actual hours of work, no account being taken of losses of time within the plant, such as are involved in "make ready," in getting started, cleaning up, etc.

Only those establishments actually operating on a schedule of 48 hours or less were included in this investigation. Certain plants reporting a nominal schedule of 48 hours per week, but having actual working hours regularly in excess of this time, were necessarily excluded, because conclusions as to the effects of a reduction to a week of 48 hours or less could not properly be drawn from the experience of such plants. Neither were those plants included in which manufacturing conditions had so radically changed as to invalidate a comparison of output in the periods before and after the change in hours.

In those establishments where certain departments only were affected by the reduction in hours, or where women exclusively were working on the basis of a week of 48 hours or less, only those workers affected were included in the total number of employees for that industry.

In certain establishments, especially in the boot and shoe industry, it was reported that pieceworkers kept irregular hours, approximately the same as before the reduction in nominal hours. Such establishments were included because it appeared that the reduction in the work day for the plant as a whole was conducive to better attendance on the part

of the pieceworkers and consequently to increased hourly output for the plant as a whole.

In the few cases in the investigation in which a change from a two-shift to a three-shift system was taken account of, the change was viewed solely as a change from a longer to a shorter working schedule, comparisons of output being made on the basis of a single shift. The problem of the shift system itself is somewhat distinct from that of a reduction in working time¹.

BASIS OF THE REPORT

The investigation includes establishments in the cotton, wool, silk, boot and shoe, metal, and certain miscellaneous manufacturing industries. The various industries were treated separately wherever the number of establishments replying in any one industry was considered representative. The number of establishments and total number of employees in each industry were as follows:

Industry	Number of Plants	Number of Employees
Cotton	53	36,061
Wool	61	37,049
Silk	23	8,884
Boot and Shoe	88	65,162
Metal	117	169,519
Miscellaneous (a)	94	56,861
	436	373,536

^a The various manufacturing industries included in the miscellaneous group and the number of establishments in each, are given on page 73 of this report.

Most of the plants in the textile and boot and shoe industries are located in Massachusetts and other eastern States, inasmuch as the manufacturing centers for these products are chiefly in this section; but the establishments in the metal and miscellaneous industries represent practically all the large manufacturing centers in the country.

¹In changing from a two-shift to a three-shift system, if hourly output is increased at all there is an increase in total output with the same overhead cost, and the problem becomes one of weighing the increased production against the increased labor cost. In a plant operating only one shift, however, it is necessary that hourly output be increased to the extent of compensating for the loss in working time, else overhead cost per unit of product is increased.

The establishments studied in each industry range in size from very small plants employing only a few workers to extremely large ones with many thousands of employees.

The change in work hours in Massachusetts establishments was in most cases largely the result of the State law, effective July 17, 1919, limiting the work week of women and minors to 48 hours. In other states the reduction in hours was brought about chiefly as the result of strikes, trade union activity, request of employees or voluntary agreement with employees. In certain cases the change was made to meet "local labor conditions"; to "follow the example of other mills," or to "better working conditions." In a few instances the reduction in hours in individual plants was the result of experiments to ascertain the most satisfactory working schedule.

Most of the changes occurred in 1919, particularly in the textile and boot and shoe industries, which, being located for the most part in Massachusetts and employing a large number of women workers, were directly affected by the legislation in that State. In the metal industry, however, and in certain miscellaneous industries, where the fatigue element is prominent, the eight-hour day had been adopted in many cases at a much earlier date.

Approximately one-fourth of the total number of employees in the establishments studied were women. The proportion of women workers to the total working force in the various industries was as follows: cotton, 45.3%; wool, 35.1%; silk, 44%; boot and shoe, 34%; metal, 5.7%; miscellaneous, 29.4%.

WORK-WEEK SCHEDULES

A straight "eight-hour day" with a 6-day week was found in only a small number of establishments. Such a schedule was reported chiefly by those plants operating three shifts a day, of which only a very few were included in this study. By far the larger number of establishments reported a 48-hour week, usually with somewhat more than eight hours on five days, and somewhat more than four hours on Saturday. The 45-hour week was found to be divided into five days with nine hours a day. The 44-hour week, where found, was a

5½-day week with eight hours on five days, and four hours on Saturday.

The work-week schedules reported in the various industries are listed below:

Industry	Number of Establishments	Number of Hours Per Week
Cotton	53	48
Wool	61	48
Silk	14	48
	9	44
Boot and Shoe	52	48
	1	47
	31	45
	5	44
Metal	98	48
	1	47½
	1	47
	6	45
	2	44½
	9	44
Miscellaneous	72	48
	1	47
	1	46½
	4	45
	14	44
	1	43½
	1	47½ for men, 45 for women

In the large majority of cases those plants operating on a 48-hour schedule had reduced from a week of 54 or 55 hours. Practically all of the establishments operating on a 45-hour schedule had reduced from 50 or 55 hours, and those operating on a 44-hour week for the most part had reduced from a week of 48 hours.

II

SUMMARY OF FINDINGS

The results of this investigation into experience with a work-week of 48 hours or less in manufacturing industries are here summarized. Both the broad, general conclusions reached and the findings for individual industries and for a miscellaneous group are included.

GENERAL CONCLUSIONS

Changes in Weekly Output

1. In 87.2% of the establishments studied a reduction to a work week of 48 hours or less was accompanied by a decrease in weekly output per worker. In 8.7% of the plants the workers were able to maintain weekly output, and in a very few cases (4.1%) weekly output was increased. These results are shown in the accompanying chart.

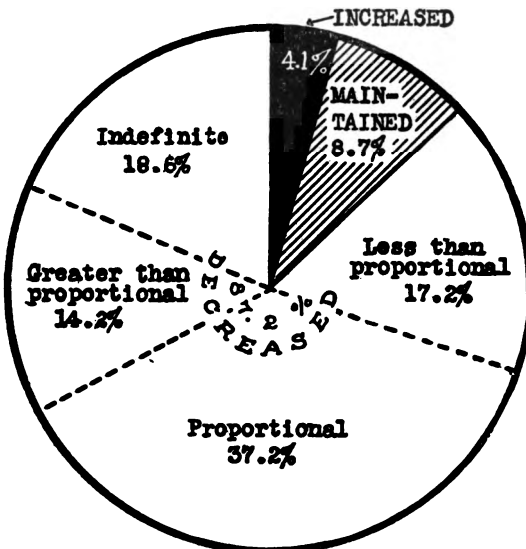


DIAGRAM 1: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A WEEK OF 48 HOURS OR LESS IN MANUFACTURING INDUSTRIES.

436 ESTABLISHMENTS—373,536 EMPLOYEES.

Changes in Hourly Output

2. In slightly more than two-fifths of those establishments in which weekly output was decreased, the same hourly output was maintained as under the previous schedule of hours, and the decrease was therefore approximately in proportion to the reduction in hours. In about one-fifth of the establishments which showed a decline in weekly output, hourly output was increased sufficiently to partially offset the loss in working time, and the loss in weekly output was therefore less than proportional to the reduction in hours. In one-sixth of the establishments suffering reduced weekly production there was a decrease in hourly as well as weekly output, or a decrease in weekly output greater than proportional to the reduction in hours. A number of establishments reported a decrease in output but did not report the extent of such decrease per worker.

Effects on Health and Contentment of Workers

3. The Board was unable to secure information which would warrant valid conclusions regarding the effect of the reduction in hours upon the health of the workers or upon the frequency of accidents. In most cases no change in the health of the workers was reported. It is interesting to note, however, that a number of the establishments in the various industries which either maintained or increased previous weekly production, reported better health among their employees, either as a result of the shorter hours or of improved working conditions.

From the evidence contained in the replies to the questionnaire, it was impossible to reach any conclusions as to the effect of the reduction in hours upon the contentment of the workers. It is probable that in many cases the reduction in working time was at least a contributory factor in improving the contentment of the worker; but so many other factors also entered into the problem and in so many cases apparently completely counteracted the effect of the reduction in hours, that it was not possible to draw any definite conclusions in regard to the effect that the one factor, shortened hours, may have had in this regard.

Effects on Quality of Product

4. On the whole, the quality of production was maintained. A very few establishments reported a better quality of production. In certain establishments, however, the speeding up by the workers to increase hourly output resulted in an inferior quality of goods, and in other instances a general slackening on the part of the workers caused a decline both in quantity and in quality of output¹.

EFFECT OF OTHER FACTORS ON OUTPUT

It was clearly evident in this investigation that a large number of factors beside the reduction in working time were involved in these changes in output. The findings of the investigation with regard to these collateral factors are summarized as follows:

Character of the Work

1. The character of the work, i. e., whether the process was largely handwork or machine work, for the most part determined whether or not it was possible for the worker to increase hourly output.

In those industries, such as cotton manufacturing, where highly automatic machine processes predominated, the output was limited almost entirely by the speed of the machines. In practically every case a reduction in hours was accompanied by a decrease in output. In those industries, however, where handwork predominated in the manufacturing processes, or where the skill and speed of the operative in handling the machines were the controlling factors—such as in the boot and shoe industry or in certain kinds of metal manufacturing, and in certain miscellaneous industries—it was possible to increase the hourly output of the workers, in some cases to the

¹In this connection it must be considered that during this period it was still difficult in some cases to procure a good quality of raw material because of the influence of war demand, and that the quality of production might have been thereby affected. There is, however, very little evidence on this point.

extent of entirely compensating for the loss in working time or even exceeding the previous weekly production.²

Character of the Working Force

2. Whether or not a plant increased hourly output, where the character of the work made such increase possible, seemed to depend largely upon the general attitude and characteristics of the working force.

Although labor unrest was noted to some extent in establishments in every group, in most cases where increased hourly output was reported, contentment and a spirit of cooperation on the part of the workers were noted, and a large proportion of establishments showing a decrease in hourly output reported dissatisfied, indifferent workers.

The labor supply apparently also had a direct bearing upon output. Scarcity of skilled labor in a number of cases resulted in an inferior quality of production and reduced output, both because of the unskilled workers necessarily employed in part, and because of the lessened ability of management to enforce discipline under the circumstances.

Irregularity in attendance accompanying high wages was also reported as materially influencing output.

It was not found that the proportion of women workers in any way affected output.

The evidence did not show that the nationality and racial characteristics of the workers had any material influence upon output.

Changes in Management or Equipment

3. Changes in management or equipment accompanied the change in hours in a number of establishments, and in a significant number of instances accounted for marked increases in output.

²It must be noted that while the various industries are characterized as largely handwork or largely automatic machine work, within each industry, no matter what its general characterization, certain processes are almost purely handwork and other processes almost purely automatic machine work, with a great range of combinations of handwork and machine work in others. In individual plants manufacturing specialized products, moreover, the character of the work is often entirely different from that which characterizes the industry as a whole.

Although as a rule the most efficient speed for obtaining maximum results from the machinery had already been determined and adopted, in certain cases it was found possible to increase the speed of the machines and thereby increase output to that extent. The installation of additional machinery or improved machinery also aided production in certain of the establishments studied¹.

Wages

4. It was practically impossible to ascertain that, in general, increases in wage-rates had any effect upon the efficiency of workers, inasmuch as all wages were increased so greatly during the period covered by the investigation. In a number of establishments, however, where piece-rates were reported unchanged at the time of the reduction in hours, the pieceworkers increased hourly output, often sufficiently to compensate for the loss in working time.

The system of wage payment itself, however, seemed to have a direct influence upon output. In almost every case where a difference in production was reported, pieceworkers were more successful in maintaining output than were day-workers. In each industry it was characteristic of the group which suffered a less than proportional decrease in weekly output that in a large proportion of the establishments the increase in hourly output was credited to the pieceworkers.² A bonus system, whether used in place of, or in conjunction with, the piece-rate system of wage payment, in a significant number of cases proved an incentive to increase production. So little experience with profit-sharing was reported that no conclusion could be drawn in regard to its influence.

Extent of Reduction in Hours

5. The extent of reduction in working time seemed to have little bearing upon ability to maintain production.

¹It must be considered, however, that those establishments already operating with a high degree of efficiency had less opportunity to improve methods of management than those with a lower degree of efficiency.

²The proportion of pieceworkers in each industry was as follows: cotton, 58.4%; wool, 48.0%; silk, 64.7%; boot and shoe, 69.5%; metal, 23.2%; miscellaneous industries, 47.9%. A large number of metal manufacturing establishments and establishments manufacturing miscellaneous products reported no pieceworkers.

For instance, those plants which reduced their working schedule from 50 hours to 48 hours per week did not, on the whole, show a markedly better ability to increase hourly output than those which reduced from a longer schedule of hours.

Those establishments which reduced to less than 48 hours per week suffered approximately the same relative decrease in production as those reducing only to the 48-hour week, except in one industry. In the boot and shoe industry a majority of the establishments in the 45-hour group suffered a greater than proportional decrease in weekly output, but other factors so complicated the problem in the case of these plants that this result could not be attributed wholly to the reduced hours of work.

So little experience with the three-shift day was reported that no general statement can be made regarding the efficiency of operating on this basis. (See page 4.) It is interesting to note, however, that half of those establishments changing from a two-shift to a three-shift day reported a proportional decrease in weekly output, or no change in hourly output. Only one establishment reported a maintenance of previous weekly output per worker, which was credited largely to better methods of production. The other establishments either reported a less than proportional decrease in weekly output; that is, an increase in hourly output, or reported a decrease in weekly output without stating the amount of such decrease.

Size of Establishment

6. The size of the establishment had in itself no apparent relation to the ability of a plant to maintain output. This was shown by the fact that in those groups which increased as well as in those which decreased output, both very large and very small establishments were found.

CHANGES IN OUTPUT BY INDUSTRIES

The changes in output accompanying the reduction in hours in the various industries are shown in the following table. The results in this table have been presented by the

number of establishments only, inasmuch as the number of employees in the plant was found in general to have no bearing upon the ability of a plant to maintain output.

TABLE 1: COMPARISON OF CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A SCHEDULE OF 48 HOURS OR LESS IN VARIOUS MANUFACTURING INDUSTRIES

INDUSTRY	ESTABLISHMENTS REPORTING			
	Output Increased	Output Maintained	Output Decreased	Total
Cotton	..	..	53	53
Wool	..	1	60	61
Silk	..	1	22	23
Boot and Shoe	3	13	72	88
Metal	9	16	92	117
Miscellaneous	6	7	81	94
Total	18	38	380	436

These changes in output are also shown graphically in the diagram on the following page.

1. In the *cotton manufacturing industry*, in which automatic machine processes predominate, the adoption of a 48-hour week resulted in a loss in weekly production in all of the 53 establishments studied. No improvement in the hourly output per worker occurred, except in five plants.

2. In the *wool industry*, in which automatic machine processes also largely predominate, although to a less extent than in cotton manufacturing, adoption of a 48-hour week was accompanied by a loss in weekly output in all but one of the 61 establishments studied. In this industry, however, a larger number of establishments than in the cotton industry reported an increase in hourly output. The one establishment which was able to maintain weekly output was a felt hat manufacturing company.

3. In the *silk manufacturing industry*, in which handwork is a somewhat more important element than in either cotton or wool manufacturing, the adoption of either the 48-hour or 44-hour week was accompanied by a loss in weekly output in

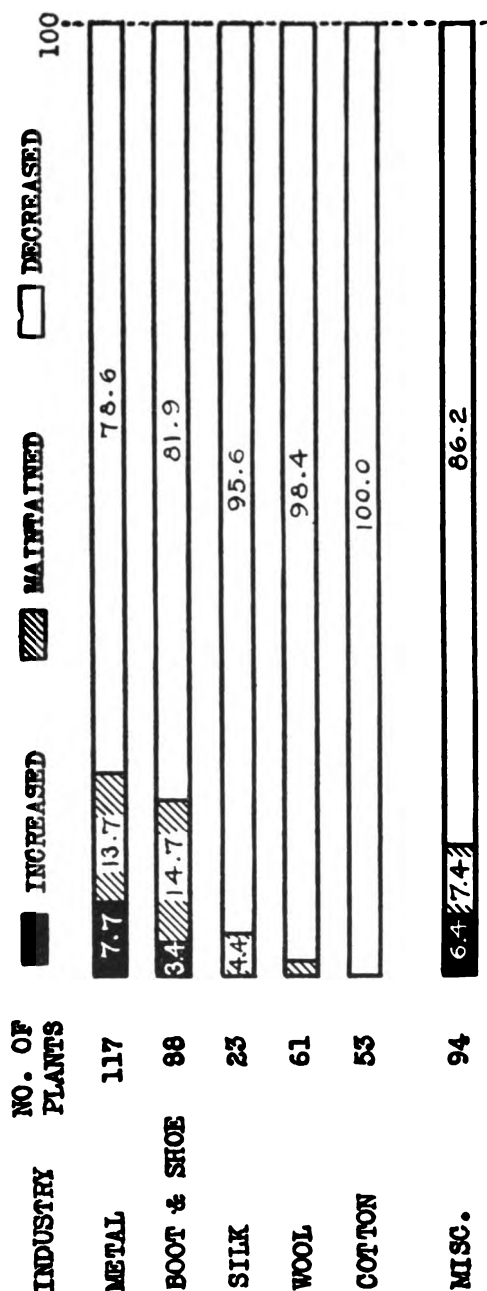


DIAGRAM 2: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A WEEK OF 48 HOURS OR LESS IN VARIOUS MANUFACTURING INDUSTRIES.

22 of the 23 establishments from which data were secured. An improvement in hourly output was reported in five establishments, but in one case only was this improvement sufficient to offset the reduction in working time.

4. In the *boot and shoe industry*, in which machine processes are highly developed, but in which the speed and skill of the operative is a most important factor, the adoption of a week of 48 hours or less was accompanied by loss in weekly output in 72 of the 88 establishments. Thirteen establishments were able to increase hourly output sufficiently to compensate for the loss in working time, and three establishments were even able to exceed previous weekly production.

5. Of the 117 establishments in the *metal manufacturing industry*, approximately 92 plants, or 80% reported that the reduction in hours was accompanied by a loss in output. Here also the number of establishments (46) in which the reduction in hours was accompanied by an increase in hourly output was significant. In 25 cases this increase in hourly output was sufficient wholly to offset the reduction in hours. In nine plants the total weekly production showed an increase. In certain establishments in this group, heavy physical labor or handwork processes were a prominent feature; in others, however, more or less automatic machine processes predominate. The extent to which handwork or heavy physical labor were marked had a bearing on ability of plants in this industry to maintain production.

6. Of the 94 establishments in the group of *miscellaneous industries* six plants increased weekly output and seven plants maintained weekly output. The miscellaneous industries, even more than the metal manufacturing industries, were characterized by a large variety of processes, ranging from those in which physical labor was a large factor to those marked by purely automatic machine work. Here again the extent to which handwork was a feature of the industry had a bearing on the ability of plants to maintain production.

More detailed statements of these findings are given in the separate discussions of the individual industries.

EXPERIENCE IN GREAT BRITAIN

The findings in this report correspond generally to those in the report of the British Inspector of Factories, recently issued, wherein it was stated:

The reports disclose wide differences of experience as to the effect of the shorter hours on production. Frequently it is impossible to make a fair comparison of output before and after the shortening of hours of work, owing to other changes in conditions. Among these changes may be mentioned alterations in machinery or organization, extensions of work necessitating the employment of much untrained labor, scarcity of workers (particularly of skilled workers), irregular supplies of materials, changes in quality or class of product and in systems of payment.

When the production depends almost entirely on the speed of machinery—as in cotton or woolen spinning—the output is said to be reduced in a proportion nearly, if not fully, corresponding to the reduction in hours. In other machine operations which call for constant alertness on the part of the operator (e. g., weaving) output has not suffered to this extent, and, in exceptional cases, has scarcely been affected at all. In a third class of process, where output is largely or entirely dependent upon the exertion of the worker, there is frequently no loss in production. Indeed, in one wholesale tailoring establishment an increase of 40 per cent is reported (partly due to reorganization); while in a boot factory, where the hours of work were reduced from 52 to 48 per week, there was a considerable increase in output. Unfortunately, a few of the reports indicate an extremely unfavorable result in some works, where the shortening of hours has been followed by a reduction in the hourly rate of production, and for this result no adequate explanation has, as a rule, been given.¹

¹ Great Britain. Chief Inspector of Factories and Workshops. Annual Report, 1919, pp. 88-94.

III

COTTON MANUFACTURING

Data for this industry covered 53 cotton manufacturing establishments, all of them Northern mills, employing 36,061 workers.

CHANGES IN WORK-WEEK SCHEDULES

All of these establishments reported a reduction to a weekly schedule of 48 hours. In nearly every case this schedule was divided into a 5½-day week, with a Saturday half-holiday. In two cases, where there was a change from a two-shift to a three-shift day, the full six-day week with eight hours a day was reported. In one case the five-day week had been adopted by an establishment working two shifts a day, and employing no women.

Before the reduction all establishments had operated on a 5½-day week, except in one case where the work was on a two-shift basis. In 47 of the 53 plants the reduction was from a 54-hour week. One plant previously operated on two shifts of 66 and 78 hours. In the other establishments the previous schedules varied from 50 to 58 hours.

CHANGES IN OUTPUT ACCOMPANYING REDUCTION IN HOURS

None of the plants covered in this industry were able to maintain or increase weekly output per worker after the reduction to a 48-hour week. Five plants increased hourly output, but not sufficiently to maintain weekly output; that is, they decreased weekly output less than in proportion to the reduction in hours. The largest group was composed of 27 plants, which maintained hourly output, but decreased weekly output in proportion to the reduction in working hours. The group which decreased output more than in proportion to the reduction in hours included 14 establishments. These establishments suffered a decrease in hourly output as well as in total weekly output. Seven establishments reported output decreased, but did not state the amount of such decrease.

The changes in weekly output in the establishments covered are shown in the following table, which gives the number of

plants and the percentage of the total number of employees included in each group:

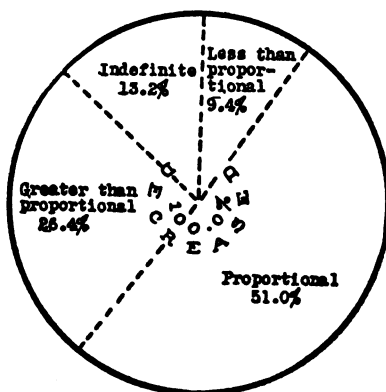
TABLE 2: COTTON MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 48-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	0	0.0
Maintained	0	0.0
Decrease, less than proportional to the reduction in hours	5	11.2
Decrease, proportional to the reduction in hours	27	43.2
Decrease, greater than proportional to the reduction in hours	14	36.5
Decrease, amount not stated	7	9.1
Total	53	100.0

These changes are illustrated also in the following diagram, which shows the percentage of the total number of plants reporting changes in each group:

DIAGRAM 3: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING A REDUCTION TO A WEEK OF 48 HOURS OR LESS: COTTON MANUFACTURING.
53 ESTABLISHMENTS



ANALYSIS OF CHANGES IN OUTPUT

Output Increased or Maintained

None of the plants covered in this industry were able to increase or even maintain weekly output per worker after reducing to a 48-hour week.

Decrease in Output Less than Proportional to Reduction in Hours.

Five plants reported an increase in hourly output, or a decrease in weekly output per worker less than proportional to the reduction in hours.

Three of the five establishments stated that pieceworkers were better able to increase hourly output than day workers. One of these manufacturers, however, declared that the piecework was somewhat inferior in quality. The other two establishments reported a general decrease in weekly output throughout all departments, somewhat less than proportional to the reduction in hours.

Proportional Decrease in Output.

By far the largest group consisted of those establishments which maintained hourly output, that is, whose decrease in weekly output per worker was proportional to the reduction in hours. This group included 27 establishments.

In one establishment new machinery was installed, and in another the machinery was speeded up in an effort to maintain production, but the other plants reported no changes which would have a bearing on output.

Three establishments reported that piecework output was decreased slightly less than daywork output, but that the general decrease was approximately proportional to the reduction in hours.

Practically all of these establishments reported that there was no change in the attitude of the workers after the reduction in hours of work.

In four of the 27 plants an inferior quality of production was noted, but all others reported that the quality was maintained.

One manufacturer reported that the workers temporarily increased hourly output, but gradually reverted to the old hourly rate of production:

This company adopted the 48-hour schedule over three years ago on humane grounds. From an examination of statistics it would seem that for a little while production was kept up, then slipped back to the old hourly average. It is certain that where machines are largely

automatic, and the hours per day are reduced from 9 to 8 the production is reduced in proportion.

A manufacturer of cotton cloth stated:

When we reduced our hours from 60 to 54 there was absolutely no gain per hour in production, and when we reduced from 54 to 48 I could not see that we gained one pick per hour. The disposition to give a full day's work of 8 hours is less than it was to give a full day's work of 9 hours.

One manufacturer of cotton warp wrote:

Our general production has fallen off about proportionately to the hours worked. The workers feel that they have the right to soldier as much on short hours as on the longer time.

A braid manufacturing establishment reported the following experience:

Change in production is due entirely to the fewer hours worked, as production per machine is governed by time run.

A manufacturer of denims stated:

We have no reason to complain that our employees are not endeavoring to give us as honest work for 48 hours as they did for 54. We have a good understanding with our employees and we think they appreciate our efforts in trying to treat them fairly and honestly, and with very few exceptions we believe they are trying to reciprocate.

Greater than Proportional Decrease in Output.

Fourteen establishments reported a decrease in weekly output greater than proportional to the reduction in hours, or a decrease in hourly as well as weekly output.

Most of the establishments reported a general decrease throughout the plant. In a few plants the decrease was especially noticeable in certain departments, notably weaving, carding, spooling and spinning. Three establishments reported a decrease in the quality of production. Eight of the 14 establishments reported increased discontent and indifference on the part of the workers.

In a number of cases other factors besides the reduction in hours were reported as affecting output. Irregularity of attendance accompanying high wages was considered largely responsible for decreased output in several establishments.

The management of one large gingham manufacturing establishment which conducted extensive educational work

among its employees and reported a very low labor turnover, made the following statement:

Our production is exactly 20.3% less than in 1915—11.1% less because of the reduction from a 54 to a 48 hour week, 9.2% because of absenteeism and inefficiency. Our foreign help cannot yet accustom themselves to high wages. For \$1.00 in individual wages per hour five years ago we now pay \$3.23, and the workers do not produce as much individually per hour.

A manufacturer of cotton novelties related the following experience:

After the change in hours from 54 to 48, our plant showed not only a decrease in the weekly output, but a decrease in the hourly output. This we think was due not altogether to the indifference of the workers, but to the growing scarcity of labor at that time. We believe, however, that if we had had the same workers at both periods, production would have decreased in proportion to the decrease in hours. We have had more labor difficulties since the decrease in hours than ever before, but this we think has been due to abnormal conditions and to the scarcity of labor.

A cotton cloth manufacturer stated:

Our operatives show increasing discontent, inefficiency, and a considerable number of them are deliberately laying down on their work, apparently for the purpose of preventing full production.

Another cotton cloth manufacturer expressed the following opinion:

Hours of labor have been reduced to the point where it is causing laziness.

Another stated:

Our experience on the day run has shown that we are probably losing something more than the proportional loss in product because of the reduction in hours, but in our judgment this is largely due to a general shortage of textile mill help and to the use of help of a lower grade of ability than we employed several years ago. Increased earnings due to wage increases have also tended to reduce the steadiness with which the operative works.

The establishments in this group were characterized by evidences of general labor unrest among the employees.

Decrease in Output—Amount Not Stated.

In addition to the above groups seven establishments reported a decrease in weekly output but did not state the amount of such decrease. None of these establishments re-

ported unusual features which would explain the decrease in output.

CONCLUSIONS FOR COTTON MANUFACTURING

1. Because of the predominance of automatic machine processes in the cotton manufacturing industry, output was limited almost entirely by the length of time the machines were run. This was shown by the fact that none of the 53 establishments studied were able to maintain weekly output under the 48-hour week, and only five establishments reported an increase in hourly output. A majority of the plants decreased weekly output approximately in proportion to the reduction in hours.

2. In a few cases pieceworkers were better able to maintain output than day workers, though in the reports of most of the establishments no differentiation was made between piecework and daywork output.

3. Evidences of general labor unrest were most apparent in those plants which suffered a greater than proportional decrease in weekly output. Discontent and indifference of the workers and irregularity of attendance apparently had a direct influence upon production.

GENERAL OPINION ON LENGTH OF WORK WEEK

Of the 44 manufacturers expressing an opinion as to the most satisfactory work week for this industry, two preferred a 55-hour week; one a 55-hour week in winter and a 48-hour week in summer; 21 plants, approximately one-half of the total number, preferred their previous schedule of 54 hours per week; five preferred a 50-hour week; and 15 preferred the present 48-hour week.

It was to be expected that those establishments which were able to increase hourly output might find the shorter work-week satisfactory, and such an attitude was shown by the replies of all but one of these plants. It was also true that

those which suffered a decrease in hourly as well as weekly output were almost unanimously opposed to the 48-hour week. It was interesting to note, however, that half of those establishments which experienced proportional decrease in weekly production favored the 48-hour week, and half the 54-hour week.

The following reasons for preference of a five-day week of 50 hours were given by one manufacturer:

For some time previous to being forced on a 48-hour basis by state law we ran on a 50-hour basis—five days, ten hours, stopping all day Saturday. We cut out one start and one stop (always a certain loss). We saved banking fires and waste of steam for one night per week. We gained hours of labor, as employees knew they would have a workday to themselves each week. There were other numerous advantages, chances for repairs, giving Sunday to the help, etc. The help saved in car fares; married women had more time at home; men could work in their gardens and have Sunday as a full day of rest if they chose; it gave them two full days if they wished to go away. We do not believe in a 48-hour six-day week; at least 95% of our help would prefer the 50-hour five-day week.

The following expressions of individual opinion on the hours-of-work problem in the cotton manufacturing industry are interesting.

A manufacturer of cotton novelties stated:

We have found that a large proportion of the workers prefer to work more than 48 hours a week, providing they get extra pay for the hours in excess of the 48. In fact, in some departments we are unable to get a good class of help unless we give them overtime work.

An establishment manufacturing fire hose and insulating fabric expressed this opinion:

Our labor laws, being enforced to the letter, prohibit all overtime work, but until conditions are normal and production is up to the demand, we believe that it is false economy and poor judgment to do so.

A cotton cloth manufacturer stated:

We reduced our hours from 54 to 48 on February 3, 1919. There was a demand, as you know, all over the east and north for this shorter week. We opposed it on the ground that we could not compete with those states which ran 54 to 60 hours, and in some places even 66 hours a week, and that we had to sell our product in the

same market with these mills running longer hours. The shortening of hours and other contributory causes made such a shortage of goods that we have felt no competition from any quarter up to date. The buying public has paid the bill and will continue to do so, I feel, until such time as there is an increase of spindles and looms sufficient to make up for the loss of hours, and an increase over the pre-war demand. Another thing that has contributed to the high cost of goods has been the fancy wages paid mill operatives, which enabled them to work fewer days per week than formerly, and enabled a very large percentage of families who have one or more members working in the mill to stay at home and be supported by the others.

IV

WOOL MANUFACTURING

The investigation afforded data from 61 wool manufacturing establishments, employing 37,049 workers.

CHANGES IN WORK-WEEK SCHEDULES

All establishments reported a reduction to a weekly schedule of 48 hours.

In two plants this was divided into a five-day week. In one case the change in hours was accompanied by a change from a two-shift to a three-shift day with a full six-day week. All other establishments reported a $5\frac{1}{2}$ -day week, in most cases divided into $8\frac{3}{4}$ hours on five days and $4\frac{1}{4}$ hours on Saturday, or $8\frac{2}{3}$ hours on five days and $4\frac{2}{3}$ hour on Saturday. Six plants operated two shifts a day.

In the majority of cases the reduction was from a 54-hour week of $5\frac{1}{2}$ days. The other establishments reported previous weekly schedules for men ranging from 50 hours to 60 hours per week; the schedules for women in very few cases exceeded 54 hours per week.

CHANGES IN OUTPUT ACCOMPANYING REDUCTION IN HOURS

In this industry no establishments reported that they were able to increase weekly output per worker on a 48-hour week, and only one establishment reported that weekly output was maintained under the shorter schedule of hours. The largest group, including 36 establishments, maintained the same hourly output as before, and therefore decreased weekly output in proportion to the reduction in hours. Twelve plants reported a decrease of output less than proportional to the reduction in hours, six a greater than proportional decrease, and six a decrease in amount not stated.

In the following table are shown the number of establishments and percentage of total employees covered in the industry included in each group reporting changes in output:

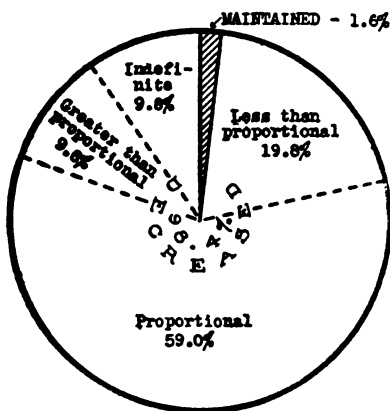
TABLE 3: WOOL MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 48-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	0	0.0
Maintained	1	11.3
Decrease, less than proportional to the reduction in hours	12	12.9
Decrease, proportional to the reduction in hours	36	51.1
Decrease, greater than proportional to the reduction in hours	6	15.8
Decrease, amount not stated	6	8.9
Total	61	100.0

The following diagram shows the changes in weekly output reported by the establishments covered in the wool manufacturing industry, by percentages of the total number of establishments:

DIAGRAM 4: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING A REDUCTION TO A WEEK OF 48 HOURS OR LESS: WOOL MANUFACTURING.
61 ESTABLISHMENTS



ANALYSIS OF CHANGES IN OUTPUT

Output Increased or Maintained

No establishments reported an increase of output per worker, and only one plant was able to maintain previous weekly output on a 48-hour weekly schedule. The management of this

establishment, which manufactures felt hats, reported its experience as follows:

We reduced our hours from 60 to 54 about twelve years ago; then from 54 to 52½ about six years ago, and from 52½ to 48 about two years ago. Our production has not suffered as a result. In fact, in some instances we do more work on the 48-hour basis than we used to do on the 60-hour basis.

About two-thirds of our workers are on piecework, most of which is hand or partially hand operation. We employ about 1,100 girls and 3,100 men.

We have less sickness and as a whole the plant is more efficient.

In this case the ability to maintain output was due to the large amount of handwork involved in the manufacture of this particular product, and, therefore, cannot be considered typical of the wool manufacturing industry as a whole.

Less than Proportional Decrease in Output.

Twelve of the 61 plants reported a decrease in weekly output per worker less than proportional to the reduction in hours. These establishments were able to increase hourly output, although not sufficiently to maintain weekly production. In four of the twelve establishments the pieceworkers were reported better able to maintain production than day workers. In two of these establishments handwork output was decreased less than machine work output. Five establishments reported that the workers were better able to increase hourly output in the weaving department than in the rest of the plant. In three establishments bonus systems were employed to aid production. A majority of these establishments reported increased contentment on the part of the workers on the shorter schedule of hours.

One establishment manufacturing worsted and cotton warp dress goods reported its experience as follows:

Our conclusion as to the effect of the 48-hour week in spinning and weaving is that the weekly product would be reduced very closely in proportion to the reduction in working hours, if conditions had remained the same. We have, however, made changes in both of these departments which have somewhat reduced this loss in production per unit.

In these departments where hand labor predominates, and where piecework has been incentive to production, we find that the production in 48 hours has shown a better rate per hour than during the 50-hour week.

Our production is limited more by the short week in spinning than in any other department. We require women and younger help in this department and cannot, under the present laws, operate on a double shift.

On the items of health, accidents, and contentment of workers, our figures and general observation lead us to report no marked change. There is a condition of restlessness among employees which has been noticeable since the war. There is also an improved moral and physical well-being, attributable, we believe, to the combination of high wages and prohibition.

All things considered, we feel that if we had a sufficient supply of help to run our equipment we could secure an efficiency from it which would recover somewhat the loss due to reduction in hours from 54—perhaps half of that loss.

A small establishment, manufacturing bed blankets, with 30% pieceworkers, reported:

The effects of the change in hours were most noticeable in the weaving room, which sets the pace for the rest of the mill. Loss of production here reduced the amount of work for the other departments. Average working hours were reduced 12.63% with increase of about 4% in pieceworkers' efficiency. The result was a net loss of 9.5% in weekly output for the same working force, in spite of increased wages.

In the woolen dress goods manufacturing establishment whose statement follows, the pieceworkers, who constituted 50% of the working force, were able to greatly increase production.

Since April 1st, 1919, we have been working 48 hours per week, against 55 hours before.

Our records show that all departments working on piece-rates show an increase of 12 to 18% over the 55 hours period, while departments working on hourly basis are behind.

The improvement in production in 1919 did not start at once after the strike, but in June and July it was noticeable. We are convinced that shorter hours make pieceworkers stick more to their work, while day workers are more lazy than ever. A lot of time was spent formerly by our pieceworkers in corridors and dressing rooms arguing and chatting, but this is greatly reduced now.

Proportional Decrease in Output.

A majority of the plants studied suffered a decrease in weekly output approximately proportional to the reduction in hours. In this group were 36 establishments.

In two cases piecework output was decreased less than in proportion to the reduction in hours, but the average decrease in output was proportional.

In only a few establishments were certain departments mentioned as especially affected by the reduction in hours. These departments were weaving, spinning, winding, spooling, and finishing. Most establishments reported a general decrease throughout all departments. It is noteworthy that one establishment reported a temporary increase in hourly output.

A majority of the establishments reported no change in the attitude of the workers.

A woolen manufacturing plant reported:

Our weekly output on a 48-hour week is directly proportional to the output of a 54-hour week, for the reasons that our producing units are machines and the efficiency of the operators is watched very carefully. Hour for hour there has been no change in our output.

A manufacturer of worsted cloth stated:

Our experience does not show that there is any greater contentment of the operatives, neither is there any increase in production per hour through the reduced weekly schedule of hours.

A woolen and worsted goods manufacturing establishment reported that production was temporarily increased, but soon dropped to the previous level.

Upon the start of the 48-hour week, after conference with our employees, they agreed that the 48 hours should be 48 hours work, with no time for cleaning up or anything of the kind. This worked all right for a few weeks and the workers showed increased efficiency. In spite of our efforts, however, output soon dropped back to the old basis, and there is a little less, if any, difference in efficiency under the 48 hours.

A manufacturer of men's woolen suitings reported the following experience:

We went on a 48-hour a week schedule last June (1919), when the 48-hour law was put into effect, and we found that our production was reduced practically in proportion to the number of hours loss in working time. In fact, in several cases, rather than showing an increased production per worker, the employees seemed to be a trifle more easygoing and our general production suffered to a small degree.

An establishment which changed from a two-shift to a three-shift schedule at the time of the reduction in hours reported as follows:

The writer personally feels that the change has been a very wise one and our employees appear less fatigued than they formerly did. So far as production is concerned, this has not increased per man per hour, but we are certain that if our employees were so disposed, a large increase would be possible without any undue strain on our help. We are experiencing the same difficulty that all employers of labor are experiencing at present—a disinclination of workmen to permit increase in production. We have not as yet found a method to overcome this and bring our plant to the high point of efficiency which present operating conditions would warrant.

A manufacturer of woolen fabrics stated:

The reduction of the working hours forming the basic week is in most cases simply tantamount to a raising of wages. Mills continue to work the number of hours required by the exigencies of their business, and the chief difference caused by the adoption of the 48-hour week is to give workers overtime for an increased number of hours.

Greater than Proportional Decrease in Output.

Six establishments suffered a decrease in hourly as well as weekly output. In practically every case the effects of the reduction in hours were especially noticeable in either the spinning or weaving departments. One establishment reported the change from government to civil contracts as a reason for the large decrease in output.

Report of a decrease in hourly output was generally accompanied by a report of increased dissatisfaction and indifference on the part of the workers.

An establishment manufacturing ladies' worsted dress goods reported:

Prevailing shortage of help, shorter hours and larger earnings seem to have lessened the spirit of cooperation and sense of personal responsibility on the part of many workers, and an attitude of indifference and independence is becoming increasingly apparent.

Another establishment stated:

Our experience with help is that they are constantly asking for increased wages, and as we are paying as high or higher rates than most textile mills it is impossible for us to grant further increases. However, the dissatisfaction is there and we are at a loss to remedy it.

Decreased in Output—Amount Not Stated

Six of the 61 establishments reported a decrease in production, but did not state the amount of such decrease.

CONCLUSIONS FOR WOOL MANUFACTURING

1. Owing to the predominance of machine processes in the wool manufacturing industry, no establishment was able to increase previous weekly output, and only one establishment was able to maintain previous weekly output on a 48-hour schedule. The one plant which maintained weekly output was a hat manufacturing establishment in which handwork predominated to a much greater extent than in ordinary wool manufacturing.

2. That the efficiency of the worker influenced production to a certain extent, however, was shown by the fact that a small number of establishments were able to increase hourly output in certain processes.

3. In a small number of plants pieceworkers were reported better able to increase hourly output than day workers.

4. The morale of the workers seemed to have had a definite relation to the maintenance of output. Those plants which were able to increase hourly output, in most cases reported increased contentment on the part of the workers. On the other hand, most of those establishments which decreased hourly output reported that the workers were less contented after the reduction in hours.

GENERAL OPINION ON LENGTH OF WORK WEEK

The majority of statements of individual manufacturers showed a preference for the 54- or 55-hour week of $5\frac{1}{2}$ days, which in practically every case was the previous schedule of these plants. Only three establishments expressed a preference for a longer week than 55 hours. A number of establishments reported that the 48-hour week was satisfactory, but in several cases qualified this statement by the requirement that it be made national, or that it be divided into a five-day week. Five plants favored a 50-hour week.

In this connection it is interesting to note that none of those plants which were able to increase hourly output on the 48-hour week expressed a preference for it.

A concern manufacturing men's woolen suitings stated:

The chief essential in our business seems to be to have a national or standardized working day for all mills in competitive lines of work. It is very hard for those who work eight hours a day to compete with manufacturers in other parts of the country who are allowed to work ten hours per day.

A worsted manufacturer reported:

We are unable to detect any material change in the health of our operatives since we reduced our hours to forty-eight and, frankly, we feel that a large proportion of our operatives would be perfectly willing to work fifty-four hours, thereby increasing their income.

An establishment manufacturing cotton-warp suitings expressed the following opinion:

Our judgment is that a 50-hour week would be the most practical for all concerned, with nine hours each day and five hours on Saturday. The present working hours make it practically useless to run anything on Saturdays. It does not pay to start up for anything less than five hours on that day.

An establishment manufacturing worsted and cotton warp dress goods stated:

We would like to have the week extended to 50 hours to make an even nine hour day and five hours on Saturday, which would make this half day worth while. Saturday on present hours is a serious problem for us. . . . We believe that a loss in efficiency of the worker results from extending the day beyond nine hours.

Two Massachusetts establishments operating on a 5½-day week stated a preference for a five-day week under the present hours. One of these establishments made the following comment:

The law we now have prohibiting the employment of women more than nine hours in any one day prevents stopping Saturday morning. But for this we would work 48 hours in five days and stop Saturday entirely. It would pay from an economic point of view.

V

SILK MANUFACTURING

Data for this industry cover 23 silk manufacturing establishments, employing 8,884 workers.

CHANGES IN WORK-WEEK SCHEDULES

Fourteen of the establishments reduced to a schedule of 48 hours per week, and nine establishments reduced to a 44-hour schedule.

In all cases a one-shift day and a $5\frac{1}{2}$ -day week were reported. In the establishments operating on a 44-hour schedule, the week was divided into five days of eight hours each and four hours on Saturday. All but one of those operating on a 48-hour schedule reported five days of $8\frac{3}{4}$ hours each and $4\frac{1}{4}$ hours on Saturday.

The plants in the 48-hour group reduced from a weekly schedule ranging from 50 to 55 hours, and those in the 44-hour group from a schedule of from 48 to 50 hours.

In no case was a previous schedule of more than a one-shift day or a $5\frac{1}{2}$ -day week reported.

CHANGES IN OUTPUT ACCOMPANYING REDUCTION IN HOURS

Of the total number of establishments none were able to increase weekly output, and only one was able to maintain weekly output. Four establishments reported an increase in hourly output, which was, however, not sufficient to offset the reduction in hours. Eleven establishments reported a proportional decrease in weekly output, and three establishments suffered a greater than proportional decrease in weekly output. Four establishments decreased weekly output but did not state the amount of decrease.

The following table presents the number of establishments and the percentage of employees in each group reporting changes in output on reduction to a week of 48 hours or less:

TABLE 4: SILK MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A WEEK OF 48 HOURS OR LESS

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	0	0.0
Maintained	1	1.1
Decrease, less than proportional to the reduction in hours	4	8.5
Decrease, proportional to the reduction in hours	11	81.0 ^a
Decrease, greater than proportional to the reduction in hours	3	4.9
Decrease, amount not stated	4	4.5 ^b
Total	23	100.0 ^b

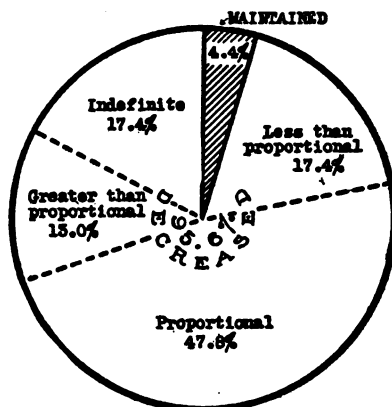
^aThis group includes one large plant with over one-half of total employees.

^bOne establishment did not report number of employees.

The changes in weekly output for all the establishments covered in this industry are shown also in the following diagram:

DIAGRAM 5: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING A REDUCTION TO A WEEK OF 48 HOURS OR LESS: SILK MANUFACTURING.

23 ESTABLISHMENTS



48-Hour Week.

The changes in weekly output accompanying the reduction to a 48-hour week, and the number of plants and percentage of total employees affected are shown in the following table:

TABLE 5: SILK MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 48-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	0	0.0
Maintained	0	0.0
Decrease, less than proportional to the reduction in hours	2	3.4
Decrease, proportional to the reduction in hours	7	89.5 ^a
Decrease, greater than proportional to the reduction in hours	1	1.7
Decrease, amount not stated	4	5.4 ^b
Total	14	100.0 ^b

^aThis group included one large plant with over one-half of total employees.

^bOne establishment did not report number of employees.

44-Hour Week.

Changes in weekly output accompanying the reduction to a 44-hour week are shown in the following table:

TABLE 6: SILK MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 44-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	0	0.0
Maintained	1	5.9
Decrease, less than proportional to the reduction in hours	2	32.0
Decrease, proportional to the reduction in hours	4	42.5
Decrease, greater than proportional to the reduction in hours	2	19.6
Decrease, amount not stated	0	0.0
Total	9	100.0

ANALYSIS OF CHANGES IN OUTPUT

Output Increased or Maintained

No plant in this industry was able to increase weekly output. One dress and tie silk manufacturing establishment maintained practically the same weekly output on the shorter schedule of hours, but also reported a slightly inferior quality of production.

The management of this establishment furnished the following figures to illustrate the experience with reduced working hours:

Our hourly output was increased with the shortening of the work-day, as follows: During a period of 50 hours per week the output per weaver was 198 yards per pay of two weeks; during a period of 47 hours per week the output per weaver was 198 yards per pay of two weeks; during a period of 48 hours per week the output per weaver was 218 yards per pay of two weeks; and during a period of 44 hours per week the output per weaver was 213 yards per pay of two weeks. The difference in the output of the day workers between 48 or 50 hours per week and 44 hours per week is a decrease of hardly 2%.

Although these figures point to the influence on production of other factors than the reduction in hours, it is clear that this plant was able to do practically the same amount of work in 44 hours as on the longer weekly schedule.

Less than Proportional Decrease in Output.

Four of the 23 silk manufacturing establishments increased hourly output and thus decreased weekly output less than in proportion to the reduction in hours. Two of these establishments were in the 48-hour group and two in the 44-hour group.

In two cases there was a decrease of machine-work output but a maintenance of handwork output. In one case there was a decrease of daywork output, but a maintenance of piecework output. In the other case practically the same decrease was noted for both handwork and machine-work output.

The proportion of pieceworkers in these plants was high. Two establishments had 90% pieceworkers, and the other two reported that 71% and 60% of their employees, respectively, were on a piece-rate basis.

Two of the four establishments reported a decrease in the quality of production.

Proportional Decrease in Output.

Eleven of the 23 establishments reported a decrease in weekly output proportional to the reduction in hours.

Seven of these establishments were in the 48-hour group and four in the 44-hour group.

In no case was any definite differentiation made between handwork and machine-work output, or between piecework or daywork output. Although two establishments reported that the effects of the reduction in hours were most noticeable in the weaving department, in most cases a general decrease in production throughout the plant was noted.

Practically all the establishments in this group reported no change in the attitude of the workers.

The largest silk manufacturing establishment included in this investigation, employing 4582 workers, reported the results of its experience with the shorter schedule of hours, as follows:

Where we have made studies with relation to the effect of decreased hours upon the product of a definite quality from specific individuals and looms, we have found that the product per hour stayed almost practically constant and that the product per day varied in almost direct ratio to the hours worked.

Our plant is operating, and has been for some time, upon a task and bonus system. We have not found it practical in any case of machine operation to increase the task per hour because of a decrease in the number of hours worked.

Another manufacturer reported a similar experience:

We can give only average results. For the last six months of 1919 an equal number of looms working 48 hours per week produced 11.2% less than while working under 54 hours schedule on the same class of goods. In other departments the results are substantially the same, except in rare cases where an operative working on piecework has shown less loss in production.

Greater than Proportional Decrease in Output.

Three establishments reported a decrease in weekly output greater than proportional to the reduction in hours, or a decrease in hourly as well as weekly output. One of these establishments was in the 48-hour group and two were in the 44-hour group.

In the two plants in the 44-hour group the decrease in hourly output was small; that is, the decrease in weekly output was very little greater than proportional to the reduction in hours. In neither case was any explanation of this reduction in hourly output given.

Though it is impossible to draw any general conclusions regarding this group of establishments, it is interesting to note that one establishment gave as a reason for the decreased production the labor shortage and the consequently lowered efficiency of the workers.

Decrease in Output—Amount Not Stated.

Four establishments reported a decrease in output, but did not state the amount of such decrease. These plants were all in the 48-hour group.

With the exception of one case, where there was a change from government to civil contracts, with a necessarily different style of goods, no outstanding characteristics were reported by any of these plants.

CONCLUSIONS FOR SILK MANUFACTURING

1. From the experience of the plants studied it was evident that the time lost in reduction to 48 hours or 44 hours per week was too great to be overcome except in unusual cases. None of the 23 silk manufacturing establishments studied was able to increase weekly output, and only one establishment was able to maintain weekly output.

2. This was due to the predominance of machine processes, though not to the same extent as in cotton or wool manufacturing. That silk manufacturing involves a certain amount of handwork was indicated by the fact that one plant increased hourly output sufficiently to wholly compensate for the reduction in hours, and in three other establishments certain departments were able to maintain previous weekly output. In all of these establishments, however, a lowering of the quality of production was reported.

3. The proportion of pieceworkers in the plants studied was very high, on the whole (67.4%), but there was no definite relation between the number of pieceworkers in a plant and the ability of that plant to maintain production. It was perhaps significant that the two plants having the greatest number of employees on a piece-rate basis, 90% in each case, were in the group of those plants which reported a less than proportional decrease in weekly output. On the other hand, the plant which maintained weekly output reported only 50% pieceworkers.

4. Those plants reporting approximately proportional decrease in output reported also, in practically every case, no change in the attitude of the workers. The one establishment which reported a substantial decrease in hourly output gave as the reason the lowered discipline of workers accompanying the labor shortage. Those establishments reporting that weekly output was maintained or decreased less than in proportion to the reduction in hours, reported either no change or an increase in the contentment of the workers.

5. The size of the plant had no apparent relation to its ability to maintain output. The largest plant, thoroughly organized, decreased production in proportion to reduction in hours. In all groups the size of the plants varied widely.

GENERAL OPINION ON LENGTH OF WORK WEEK

Only 17 of the 23 establishments expressed an opinion as to the best length of work week for the industry. These replies varied markedly. Seven preferred a 48-hour week, three a 44-hour week and the remaining seven preferred a 50-hour week or more.

The following quotation expressed the attitude of one manufacturer of broad silks:

We favor the 44-hour week so long as we can have it in the entire industry. The great drawback at the present time is that in Pennsylvania, where a lot of silk goods are manufactured, the mills are working from 50 to 60 hours per week. This longer work week is also

in effect in the states of Massachusetts and Connecticut. When business enters into more normal conditions we will either have to increase our working week to 50 hours or the other states will have to come down to 44 hours, or New Jersey will have to give up making silks, as it will not be in a position to compete. So long as silk goods are manufactured in the different states but sold in the same market, the working hours and wages should be standardized in the entire industry.

A manufacturer of silk thread and braids stated:

If it were possible for people not working on machines to do as much work in eight hours as they could in nine or ten, we would, of course, be very much in favor of the shorter working day and the extra leisure time it would afford employees. However, when this reduction of hours is made up in increased cost, decreased production and poorer quality, we are not in favor of it.

VI

BOOT AND SHOE MANUFACTURING

Data were obtained from 88 boot and shoe manufacturing establishments, employing 65,162 workers.

CHANGES IN WORK-WEEK SCHEDULES

Of these establishments, 52 reduced to 48 hours per week, one to 47 hours, 30 to 45 hours and five to 44 hours.

The 48-hour week was in every instance a $5\frac{1}{2}$ -day week. The 45-hour week was in all cases divided into a five-day week. The 44-hour week was divided into $5\frac{1}{2}$ days, eight hours on five days and four hours on Saturday. No establishment reported more than a one-shift day, and in all cases either a Saturday half-holiday or full-holiday was reported.

The previous work-week schedules ranged from 48 hours to 59 hours per week, with the 50-hour week predominating. The establishments operating on a 48-hour schedule in most cases reduced from 54, $52\frac{1}{2}$ or 50 hours per week. The establishments operating on a 45-hour schedule in most instances reduced from 55, 54, 50 or 48 hours per week.

CHANGES IN OUTPUT ACCOMPANYING REDUCTION IN HOURS

Of all the establishments covered in this industry three were able to increase weekly output, 13 maintained weekly output, and 72 decreased weekly output. Of those decreasing weekly output, 10 increased hourly output, but not sufficiently to offset the loss in working time; 22 maintained hourly output, but decreased weekly output in proportion to the reduction in hours, and 18 decreased hourly as well as weekly output. The remaining establishments did not state the amount of decrease.

The following table shows the number of establishments and the percentage of the total employees in all establishments included in each group reporting changes in output:

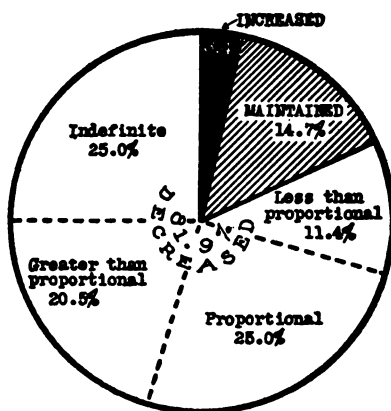
TABLE 7: BOOT AND SHOE MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A WEEKLY SCHEDULE OF 48 HOURS OR LESS

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	3	29.9
Maintained	13	15.2
Decrease, less than proportional to the reduction in hours	10	17.5
Decrease, proportional to the reduction in hours	22	13.2
Decrease, greater than proportional to the reduction in hours	18	11.0
Decrease, amount not stated	22	13.2
Total	88	100.0

The changes in output for the total number of establishments are shown in the following diagram:

DIAGRAM 6: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING A REDUCTION TO A WEEK OF 48 HOURS OR LESS: BOOT AND SHOE MANUFACTURING. 88 ESTABLISHMENTS



48-Hour Week.

Changes in output in this group of establishments are shown in detail in the following table:

TABLE 8: BOOT AND SHOE MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 48-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	3 ^a	39.0
Maintained	10	8.8
Decrease, less than proportional to the reduction in hours	6	19.3
Decrease, proportional to the reduction in hours	13	11.3
Decrease, greater than proportional to the reduction in hours	7	8.4
Decrease, amount not stated	14	13.2
Total	53 ^a	100.0

^aThis figure includes one plant operating on a 47-hour schedule.

45-Hour Week.

The changes in output in this group of establishments are shown in the following table:

TABLE 9: BOOT AND SHOE MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 45-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	0	0.0
Maintained	3	42.6
Decrease, less than proportional to the reduction in hours	2	1.9
Decrease, proportional to the reduction in hours	8	19.9
Decrease, greater than proportional to the reduction in hours	10	22.7
Decrease, amount not stated	7	12.9
Total	30	100.0

44-Hour Week.

Changes in output for establishments in this group are shown in the following table:

TABLE 10: BOOT AND SHOE MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 44-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	0	0.0
Maintained	0	0.0
Decrease, less than proportional to the reduction in hours	2	49.0
Decrease, proportional to the reduction in hours	1	24.7
Decrease, greater than proportional to the reduction in hours	1	4.6
Decrease, amount not stated	1	21.7
Total	5	100.0

ANALYSIS OF CHANGES IN OUTPUT

Output Increased.

Of the plants which were able to increase weekly output after reducing their hours of work, one was operating on a 47-hour schedule and two were operating on a 48-hour schedule.

The plant operating on a 47-hour schedule was a comparatively small establishment, which reported its experience as follows:

Until the middle of May, 1919, we had been running on the 54-hour schedule. Our records of the week of May 10th show that we employed 168 people and got an average production of 7,525 pairs.

A week or two later, we voluntarily changed to the 45¼ hour basis, knowing that we would, by the middle of August, be obliged to go on a 48-hour schedule, due to the fact that we cannot work our men employees without the women, and Massachusetts laws would allow but 48 hours of work for women. This change to 45¼ hours was in the nature of a trial, to be continued on condition that we got as much work from our employees on this basis as formerly.

Our records for the week of July 12th show that 202 employees produced 9,487 pairs, which was about a 5% increase. However, this production later dropped to around 8,000 pairs. We explain this by saying that for the first few weeks our employees showed great interest in getting out as much work in 45 hours as formerly. Later this interest declined, with a corresponding decline in production. We then went definitely on a 47-hour basis some time in September. Our records for the week of October 11th show that we had a production of 10,488 pairs.

From these records we are convinced that a 48-hour schedule will produce as much as a 54-hour schedule, owing to the fact that employees are inclined to loaf for the last hour or two each day on the longer schedule, whereas they try to clean up if they know that their time is limited and if they are working on a piece basis. Ninety per cent of our employees are pieceworkers. Our experience is illuminating only so far as piecework goes. We believe that the same results would not be obtained under a week-work plan.

Upon reducing the work hours some 20% we found it necessary to increase the pay correspondingly or about 20% for most week-workers and pieceworkers. Our production, of course, did not increase 20%, so that the net result was that we got a slightly increased production, but we paid more in wages than the 5% increase we got in production. On the other hand we had a contented force of employees, for which benefit we figure we are paying the increased price, particularly as raises all along the line were the order of the day at that season.

The figures quoted, of October 11th, hold approximately true today as to the number of employees and production.

The other two plants in the 48-hour group which were able to increase production were very large establishments.

The management of one large company, which reported over 90% pieceworkers, estimated the increase in weekly output per worker at 5%, and stated further:

Production is influenced by weather, transportation, supplies, differences in material used, style and class of goods, methods of management, morale and many other conditions.

The other plant reporting an increase in weekly output employed 16,009 workers, of whom over 80% were on a piece-rate basis. This manufacturer stated:

Production has increased as compared with pre-war activities. Before the war the peak of production was reached in 1916, with a 56-hour week and an average of 8 pairs of shoes per operative per day. The confusion of war, disorganization of our organization, reduction of hours to 48 weekly, difficulty with supplies and many other disturbing influences reduced our output during the period from the armistice to the following January to about 6 pairs on the same unit basis. Since then the output has gradually but steadily increased to 7, 8, 9, 10, and today stands at 11 pairs of shoes daily per operative on a 48-hour weekly schedule, in comparison with 8 pairs on a 56-hour schedule. We do not deal with or recognize any trade unions. By means of different methods of management the turnover has been reduced from a very high percentage to a present rate of 12.5% per annum.

The ability of these three plants to increase output was obviously due to the handwork character of most of the processes in the shoe manufacturing industry, which permitted increased efficiency of the workers on the shorter schedule.

It is significant to note that the number of pieceworkers in these establishments was very high. One establishment stated that the same results would probably not have been obtained if the work were not on this basis. The morale of the workers was mentioned by two manufacturers as an important factor in increasing output, and the third establishment reported a very small labor turnover, which indicated a contented body of workers in that plant also. Two of the establishments were notably large and well-organized and devoted an exceptional amount of attention to methods of management and to labor problems.

Output Maintained

Thirteen plants were able to maintain output. Ten of these were in the 48-hour group and only three in the 45-hour group. Two establishments reduced their working schedules from 49½ hours to 48 hours.

This group of establishments was characterized in most cases by a large proportion of pieceworkers. In two cases the pieceworkers were reported as working practically the same length of time as before, though nominal hours of work had been reduced. This had the effect of maintaining previous output in these cases. Five establishments reported a bonus system which operated as an incentive to increase production. In two establishments new machinery was installed to help maintain output. A number of establishments reported that the contentment and cooperation of the workers influenced production.

One establishment, with 95% pieceworkers, reported:

We are doing approximately as much work in 45 hours as we were doing in 50 hours, due to shop rules put into the factory by unions.

One very large establishment, which reported a bonus as well as the piecework system of wage payment, stated:

We find that our production per employee is not decreased by a reduction in working hours from 54 to 45 per week. The natural loss of efficiency in production is more than balanced by improved methods

in management and machinery and, more than all, by improvement in the morale of the worker. We are improving the morale of the worker and have increased the cooperative spirit of the works by new methods, by a scientific system of employment management, by works and district doctors and nurses, by social activities, by an employees' journal, and especially by our Planning Board which studies and directs production by looking forward for several months and keeps production normal by reports and checks every hour.

Another establishment, with 80% pieceworkers and an attendance and punctuality bonus, stated:

The changing of hours made no visible change in output. The workers did all that was sent through the works as before, but more promptly and more efficiently.

The management of another establishment, reporting a bonus for production over a certain standard, stated:

Weekly output has been maintained even though the hours of work are shorter. This is due in great part to the fact that a large number of our hands are pieceworkers who, when we worked 50 hours a week, never worked more than 46 or 47 hours, and who, under the 48-hour schedule, are still working 46 or 47 hours.

One establishment with 85% pieceworkers reported:

Our experience with the 48-hour week has, on the whole, been very satisfactory. We feel that the present arrangement of working hours (eight hours and forty-five minutes a day and half day on Saturday) is acceptable and very satisfactory to the working force. We have suffered little if any through the reduction from the 50-hour week. Production is based in the main upon the speed of the operatives in handling the machines, and so we think that the measure of contentment on the part of the operatives through shorter working hours offsets any loss in production that might otherwise occur.

An establishment with 90% pieceworkers reported:

On account of piecework and arrangement of processes, practically the same hours were worked by most of our people, as few ever remain until closing time. We changed the hours of labor in our factory to conform with the requirements for working hours for women, making the hours uniform in the entire factory for both men and women. Before starting, our hours of labor were 50 hours and 45 minutes. The reduction was not great enough to make any material difference, as our factory is run almost entirely upon the piecework basis, and most of the people did not average more than 48 hours at any time, except in special instances when we had overtime work.

Less than Proportional Decrease in Output

Of the ten establishments which reported a decrease in weekly output less than proportional to the reduction in hours,

six were in the 48-hour group, two in the 45-hour group, and two in the 44-hour group.

It was characteristic of the group which decreased output less than in proportion to the reduction in hours, that in a majority of the cases the pieceworkers maintained previous weekly output and that the dayworkers were not able to do so. In a number of cases the dayworkers received a proportional increase in pay, while the piece-rates remained the same, which would mean that it was necessary for the pieceworkers to produce the same amount as previously to obtain the same weekly wage. In three establishments bonus systems were an incentive to increase production. In certain cases also the ability to increase hourly output was due largely to improved methods of management. Increased contentment of the workers accompanied an increase in hourly output in a significant number of establishments.

One establishment reported:

There is absolutely no question but that we have lost in production, particularly among week-workers. In addition thereto it has cost us considerable for the installation of more expensive machinery in order to maintain production.

Another manufacturer who reported that the hourly output in his plant was above normal and constantly improving, stated:

The energy of the worker is improved, the morale of the establishment is higher than three years ago, the production per machine is greater. Some of this increased efficiency is due to our improved methods, health training, nursing service, group insurance, but most of it is due to the operatives. They are beginning to think, to cooperate; the union is changing also; the exercise of their initiative is making better men and women. They naturally produce better work.

Still another, reporting that weekly production was only slightly affected by lessening of hours of work, stated:

Greater efficiency in machines, methods and management in every department compensates for shorter hours. We run a closed union shop and always have. The locals are managed by officials who have been re-elected year after year. They know their business and are agreeable in their dealings. We are satisfied to do business with them.

One establishment, which reported a difficulty in maintaining the quality of production, stated:

Pieceworkers either demanded advanced prices or developed more speed and turned out poor work.

Proportional Decrease in Output.

Twenty-two establishments, thirteen in the 48-hour group, eight in the 45-hour group, and one in the 44-hour group reported a decrease in weekly output proportional to the reduction in hours.

In a small number of the establishments the effects of the reduction in working time were reported as especially noticeable in certain departments, but the average decrease for the whole plant was in most cases approximately proportional to the reduction in hours.

In most cases the establishments reported that there was no apparent change in the contentment of the workers. Two establishments reported dissatisfied workers, and in two cases increased contentment of the workers was reported, but in none of these cases was hourly output affected.

One manufacturer stated:

During the years when the hours of labor in the shoe industry were being gradually reduced from 59 to 54 or possibly 52 hours, we were able to observe some compensating advantages, although we must admit that they were largely in theory, or from the humanitarian point of view. The reductions since that period, however, have not appeared to carry any important offsets. They have simply resulted in a decreased production, with a proportionately increased cost. Concerns so operating are frequently at a disadvantage as compared with those operating longer hours.

Another manufacturer reported no change in piecework output, but a large decrease in daywork output:

Our basis of production is the stitching machine, upon which the whole factory production planning is based. These machines are producing the normal quantity today, but our day labor has been increased to keep these machines running at this speed. We figure our day labor has decreased in production about 15% below pre-war records. We employ a good many bench workers. A good many orders are for strictly hand-made shoes and we are working a number of old-fashioned shoemakers, whose product has diminished in proportion to the reduction in hours.

Still another reported:

The effects of lessening hours were naturally the most noticeable in such departments in our manufacturing plant as were least adaptable

for expansion. In our particular business, our cutting room and stitching room suffered the most because we did not have adequate space to increase the number of employees, while in all other departments we could increase employees by the placing of additional equipment which we had the room for, thereby giving us the opportunity, if we so desired, to keep up possibly our normal output as it existed before the change. Our loss in production is approximately 15% or the loss of the Saturday half-day, of which formerly we had the benefit.

Greater Than Proportional Decrease in Output

Of the 18 plants in which the decrease in weekly output was greater than proportional to the reduction in hours, seven were in the 48-hour group, ten in the 45-hour group, and one in the 44-hour group.

Half of the establishments in this group reported an inferior quality of production, and over half reported that their workers were less contented. Approximately one-third of the establishments stated that in their opinion the decrease in the hourly efficiency of the workers was due not only to the reduction in hours but to the shortage of labor, to labor unrest and high wages. Only one establishment reported a bonus or profit-sharing plan.

One manufacturer reported:

Our output has shrunk 30 to 35% and the quality of work almost as much. We attribute it to the attitude of labor due to the strength of their organization and their success in getting the Adamson Law passed.

Another stated:

We believe that without union interference it would be possible for us to produce as much in 48 hours as we formerly did in 54.

One establishment comments as follows:

The country at the present time is in great need of increased production, and in order to meet this need more time must be spent in the factory by the workers. It is, in our opinion, a fallacy to say that as much work can be done in 48 hours as in 54 hours.

Another manufacturer expressed the following opinion:

It is not any great change in hours that we feel is needed, but conscientious application on the part of the workers during the hours now worked, and a more prompt attendance during this time.

We feel that the only solution for the present situation is for the management of the various industries to have complete control and

authority over their individual organizations, free of dictation from union organizers, whose interests are often personal rather than for the good of the community at large.

If the mind of the worker could be concentrated on his work, free from all outside influence, his production and wages for a 48-hour week would be most satisfactory.

Another stated his experience as follows:

It is a serious question whether the continual cutting down of working time does not lessen the employees' sense of responsibility and loyalty to their work. Our most difficult task is to stimulate in the workers an interest in quantity and quality of production.

One manufacturer expressed the following opinion:

There is no question but what the prevailing high wages have had a tendency to make attendance less steady and to increase the desire to take a day off occasionally. The tendency can and probably will be corrected. We believe that every effort should now be made to get the greatest possible production out of the present working hours. In our own case, some slight change or reorganization of departments will enable us to at least partially make up the loss of production we have suffered. When the employees realize the necessity of working the full-hour day and the full-day week on our present schedule there is no question but that manufacturing conditions will more nearly reach normal.

The following experience with the five-day week was reported:

Having so much idle time, especially on Saturday and Sunday, when it comes Monday morning the workers are entirely unfit to accomplish their normal production or standard of workmanship on account of their mental and physical condition.

Another manufacturer operating on the five-day week stated:

In five nine-hour days production falls off materially, due to the fact that the fatigue point is reached on the nine hours, so that the operators produce no more than they would in eight. In our particular industry, where the drying of the product has a bearing on how efficiently the work can be done, the two days' stop every fifth day interferes seriously.

Still another:

This loss of a part of a legitimate business day causes many serious embarrassments in the matter of production and in the matter of transportation as well. Many contingencies could be met by the use of this half of the business day lost at the present time, thus overcoming many delays in production constantly occurring from unforeseen contingencies, and overcoming to a great extent many difficulties in transportation.

Output Decreased—Amount Not Stated.

Of the 22 establishments decreasing production, but not stating the extent of such decrease, 14 were in the 48-hour group, 7 in the 45-hour group and one in the 44-hour group. Comment from the establishments in this group points also to lowered morale of the worker as a reason for decrease of production.

One manufacturer stated:

Employees care only to earn a living with the least effort possible.

One establishment reported:

We know that in the past year the quality of production has deteriorated quite materially. We attribute this mostly to lack of discipline because of union influence, and partly to the trend of the times in labor circles.

One establishment with 50% pieceworkers reported:

There is no question but what the working man has fallen off anywhere from 10% to 25% in his production, especially where the operators are paid by the day, as they are in this factory. The manufacturer has not been in any position to get after this help because he had no choice; he had to take what he could get. Even under this exceptionally dull period where so many have been loafing in the shoe industry, we have had only one or two come and ask us for work, which shows that the condition is still very easy for the working man, or else he has money enough laid away so that he still feels independent. Our most serious problem is the labor question—short hours and the disinclination of employees to put real interest into their work.

Another manufacturer, operating on the five-day week, reported:

In general, we find a decided lessening of production, as Friday afternoon is rapidly growing to be about the same as Saturday morning formerly. The men quit work early in anticipation of receiving their pay and getting away.

CONCLUSIONS FOR BOOT AND SHOE MANUFACTURING

1. From the experience of the establishments studied in this investigation it is apparent that full production could not be maintained in the boot and shoe manufacturing industry on a 48-hour weekly schedule except in unusual cases. With a 45-hour or 44-hour week it was still more difficult to increase hourly efficiency to the extent of maintaining previous output.

2. The large part which handwork plays in the manufacturing process, however, made it possible to increase the hourly output of the worker to a much greater degree than in the textile industry, and the extent to which the work was conducted on a piece-rate basis in most cases provided the incentive for such increase. In a large number of the establishments handwork output was reported as maintained and machine-work decreased, and in many establishments the pieceworkers succeeded in maintaining their previous weekly output, while the production of the dayworkers fell off. In certain establishments, however, maintaining piecework output meant only that the pieceworkers had kept very irregular hours previously and were actually working approximately the same length of time under the present schedule.

3. In practically every case the wages for dayworkers were increased to make up for the decrease in hours, but in a number of establishments piece-rates were not increased, with the result that it was necessary for the worker either to work a longer time or more efficiently to receive the same weekly wage. This situation was reflected in the output results of those plants. A bonus accompanied a large increase in hourly output in a number of establishments.

4. The morale of the worker apparently had a direct bearing upon output. This was true, of course, in all of the industries studied, but seemed to be more especially noticeable in this industry, where the human element was so great a factor in production. In general, most of those establishments reporting the attitude of the workers as good or better, were those which suffered little or no decrease in weekly output, whereas those reporting less contentment on the part of the workers, because of general labor unrest, labor shortage, high wages, lack of discipline, and attitude of the unions, sustained a decrease in production, in most cases greater than proportional to the reduction in hours. Especially was this true in certain of the highly unionized districts of Massachusetts.

GENERAL OPINION ON LENGTH OF WORK WEEK

The replies of a majority of the manufacturers disclosed a preference for the 50-hour week. The 48-hour week was

avored by a comparatively large number, but usually with qualifications as to working conditions or regarding its general adoption in the industry. A smaller number expressed the opinion that a 54-hour or a 55-hour week would be most satisfactory.

One manufacturer commented, as follows:

If we were starting a factory in a place where we could do reasonably as we chose, we believe that we would operate about 9½ hours for five days and about five hours on Saturday. If local sentiment permitted our operating a full day Saturday, during say eight months in the year, six days of about nine hours would be splendid. This layout is on the basis of industrial efficiency, with reasonable regard for the other phase of the subject.

One establishment expressed a preference for a 50-hour week:

While we feel that the fifty hour-week is the ideal one, and we know that, under normal conditions, production would increase, we have no data other than our opinion in this matter.

Another stated:

As a matter of fact, the shorter day with the same rate of wages as before, in place of having a stimulating effect on the employees, has worked the opposite. We feel that a 50-hour week would be best for all concerned, now that the half-holiday Saturday has become universally adopted.

One establishment operating 48 hours per week stated:

Since the eight-hour day is more or less an accepted fact of the shoe industry, it would seem to us inadvisable, at least under present conditions, to make any effort to lengthen the hours of this schedule.

One manufacturer expressed a preference for a five-day week in the present circumstances:

Personally the writer thinks that the Saturday half-day work does not accomplish much, and it is doubtful in many instances whether the employee would come in at all if it were not pay day. It seems to the writer that it only breaks up the day and that much more could be accomplished if the working day were nine hours, five days a week, with no Saturday work.

VII

METAL MANUFACTURING

Data were received from 117 metal manufacturing establishments, employing 169,519 workers.

CHANGES IN WORK-WEEK SCHEDULES

Of the 117 establishments, the majority reported that they had reduced their working schedule to 48 hours per week. Schedules ranging from 47 to 44 hours were also reported.

In most of the establishments the schedule was divided into a work week of $5\frac{1}{2}$ days. In one case only, in the 45-hour group, was a five-day week reported. Ten plants operated on a two-shift basis and six on a three-shift basis, and in four of these plants the full six-day week was retained.

The majority of establishments making reduction to a 48-hour schedule previously operated on a schedule of 54 or 55 hours. Those which changed from a two-shift to a three-shift basis, however, had in most cases previously worked on a 12-hour shift or with much overtime. The reduction to 45 hours was mostly from a 50-hour week, and those establishments reducing to a 44-hour week had in nearly all cases previously worked 48 hours.

CHANGES IN OUTPUT ACCOMPANYING REDUCTION IN HOURS

Of the 117 metal manufacturing establishments included in this investigation, 46 were able to increase hourly output, in 25 cases to the extent of attaining or exceeding previous weekly output; 31 plants maintained the same hourly output as previously, or decreased weekly production in proportion to the reduction in hours, and 16 plants decreased hourly as well as weekly output. Twenty-four plants reported a decrease in weekly output, but did not state the amount of such decrease.

The changes in output for all establishments are shown in the following table:

TABLE 11: METAL MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A WEEK OF 48 HOURS OR LESS

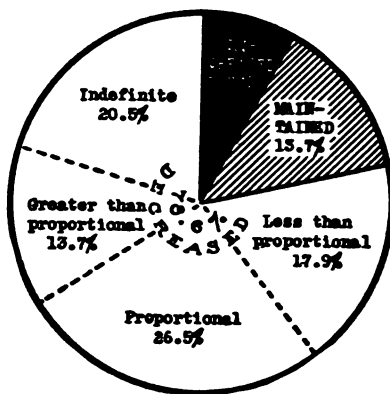
(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	9	43.6
Maintained	16	6.4
Decrease, less than proportional to the reduction in hours	21	12.5
Decrease, proportional to the reduction in hours	31	9.4
Decrease, greater than proportional to the reduction in hours	16	3.8
Decrease, amount not stated	24	24.3
Total	117	100.0

The following diagram shows the percentage of establishments in each group reporting changes in output:

DIAGRAM 7: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING A REDUCTION TO A WEEK OF 48 HOURS OR LESS: METAL MANUFACTURING.

117 ESTABLISHMENTS



48-Hour Week

The changes in output in this group of establishments are shown in the following table:

TABLE 12: METAL MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 48-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	7 ^a	55.2
Maintained	13 ^b	2.9
Decrease, less than proportional to the reduction in hours	18	12.0
Decrease, proportional to the reduction in hours	27	8.4
Decrease, greater than proportional to the reduction in hours	16	4.8
Decrease, amount not stated	19	16.7
Total	100 ^{a b}	100.0

^a Includes one establishment operating on a 47½ hour schedule.

^b Includes one establishment operating on a 47 hour schedule.

45-Hour Week

Changes in output in these establishments are shown in the following table:

TABLE 13: METAL MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 45-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	1	11.4
Maintained	1	27.7
Decrease, less than proportional to the reduction in hours	1	12.3
Decrease, proportional to the reduction in hours	2	34.2
Decrease, greater than proportional to the reduction in hours	0	0.0
Decrease, amount not stated	1	14.4
Total	6	100.0

44-Hour Week

Changes in output in this group of establishments are shown in the following table:

TABLE 14: METAL MANUFACTURING: CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING REDUCTION TO A 44-HOUR SCHEDULE

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establishments Reporting	Percentage of Total Employees in Group
Increased	1	0.1
Maintained	2	16.6
Decrease, less than proportional to the reduction in hours	2 ^a	12.6
Decrease, proportional to the reduction in hours	2	21.7
Decrease, greater than proportional to the reduction in hours	0	0.0
Decrease, amount not stated	4 ^a	49.0
Total	11^a	100.0

^a Includes one establishment operating on a 44½-hour schedule.

ANALYSIS OF CHANGES IN OUTPUT

Output Increased

Nine plants reported an increase in weekly output. Seven of these were in the 48-hour group, one in the 45-hour group, one in the 44-hour group. In all but two cases these establishments were of medium size, ranging from 200 to 1,200 employees. One, however, was very small, with 28 workers, and one plant employed 70,000 workers. Two-thirds of the plants reported increased contentment on the part of the workers. Four plants reported improved quality of production.

The experience of one establishment, as related below, was not typical, inasmuch as a highly specialized product was manufactured, but it illustrates clearly the value of scientific study of the hours-of-work problem in individual plants and the extent to which a carefully worked-out schedule of hours influenced production.

This company manufactures a line of tools and machinery for the cutting of accurate screw threads to close limits. The work is largely of a special nature, differing quite materially in practice, conditions and shop-methods from those of the ordinary machine shop or those of the builders of so-called machine tools. Much of our work is of a precision nature and requires close fitting which calls for skill both as to hand and eye. This is true both in our handwork and in most of our machine operations.

The writer had noticed, and at times had been alarmed at the frequency of illness amongst our workmen—especially among those who were concerned in the work of close fitting, grinding, inspection and testing—and at the large number of rejections in finished parts. A careful study of the conditions soon revealed the fact that nearly all parts that were finished under normal conditions, that is natural light, were largely perfect, but that parts finished under artificial light were largely defective. We also discovered that eye strain was very much greater under artificial light than under natural light, and that much of the illness affecting various departments was due to nervousness caused by eye strain. The writer started, early in 1914, a series of experiments in order to determine, if possible, how many hours a normal man could carry on the work of close fitting on polished steel without undue fatigue, and these experiments clearly proved (to the writer at least) that eight hours was about the maximum it seemed practicable to expect for a 100% finished product within the desired limits of tolerance. This meant the practical elimination of artificial light. We have been unable to find any system of artificial light that will relieve the eye strain sufficiently to prevent fatigue. The writer then decided to carry the experiment farther to determine just what drop in production might be expected under a general eight-hour day, and for one month operated the works on an eight-hour day, or 48-hour week. By speeding up certain machines to overcome a drop in wholly mechanical operations, it was found possible to retain a normal production, although in some cases a change in tooling was found necessary to accomplish results. During the month's experiment we found that our production showed a slight increase due to the fact that a greater number of finished parts were passed through the inspection, there being shown to be a considerable falling off in imperfect parts, and during the month there was practically no complaint of illness due to fatigue. The writer then decided to continue under the eight-hour day, but to establish a 45-hour week, by which Saturday afternoon would be added to Sunday and provide thereby greater time for rest and recreation.

Our production, during the first year, was, without additional equipment, not only maintained, *but increased about 10% under the 45-hour week*, this increase having been possible only through the fact that, while each operative failed to produce quite so large a number of parts as under former conditions, the product produced ran *close to 100% perfect*, whereas, under the former conditions and hours of work, rejections of finished parts had been large in number.

The experience of a manufacturer of hatchets, hammers and edge tools illustrates the possibilities of the shorter work week in another branch of the industry:

We are strong supporters of the "eight-hour day." This, of course, applies only to our own line of work. I personally believe that there are jobs such as automatic machine operating which could be run profitably

for $9\frac{1}{2}$ hours, as the work is not fatiguing. Our work, however, is very fatiguing in most of our departments, and the men working more than 8 hours a day are always slightly exhausted, losing their vitality and making them subject to diseases. Long hours also upset the nerves and make a man irritable and quick to throw up his job.

We have found, for instance, in our forging department, by working $8\frac{1}{2}$ hours the men will work steadily and hard, taking a minimum amount of time waiting for heats and setting dies, where formerly, when working $9\frac{1}{2}$ or 10 hours, waiting for heats and setting dies were considered as rest periods and consequently a sort of privileged loafing time. Our grinding department worked in a very similar manner. The operators were always slow in starting after the whistle and usually stopped 10, 15 or 20 minutes before the time of the whistle. Now the majority of our men work from whistle to whistle. We have throughout the shop a rest period from 9 o'clock until 9:10 for the men to eat a morning lunch. We figure that the majority of them eat their breakfast before 6:30 in the morning, and waiting until 12 o'clock means a very long stretch. The majority of the men bring a light lunch.

The summing up of all this is that the "eight-hour day" in our line of work is both beneficial to the employee and the employer. It tends to increase production, cut down labor turnover and raise the standard of health among the employees.

One establishment, manufacturing tire pumps for automobiles, which reduced from a 50-hour to a 48-hour week, and from one to two shifts per day, reported:

The effects of the change to a 48-hour week have not been so very noticeable in our factory, excepting among the pieceworkers, and we believe that the change there is due to the high scale of wage which machine operators and assemblers drew during the war and directly after.

Eighty per cent in this factory were on a piece-rate basis.

Three plants stated that their production was increased, but that this was due to other reasons and not to improved efficiency resulting from the reduction in hours.

One establishment, manufacturing structural steel, reported:

Since the formation of this company the plant has never worked in excess of 48 hours per week as regular working time, although it has, of course, worked overtime on several occasions. In September, 1919, it was decided to work only half a day on Saturday, thus giving the men one half-holiday per week, they to receive no pay for the half-holiday on which they do not work. This was entirely satisfactory to them and they desired to have the hours arranged in that manner. We have not found that our increased production is entirely

due to decrease in working hours, as shortly after this change was put into effect, we employed a new superintendent who is responsible for a great many improvements in efficiency and output at our plant.

A manufacturer of die castings stated:

Our output has increased 20% since shortening hours, but cannot be attributed wholly to the reduction of working time.

A third establishment reported:

We have increased production in foundry from 1100 tons per month to 1900 tons (March), due altogether to more efficient practices, and without adding an inch of floor space. This notwithstanding a reduction of an hour per day in working time. The men are not to be credited with any part in the increased output.

Two establishments reported an experience with the 48-hour week lasting over a period of years. A large automobile manufacturing establishment changed to a three-shift day and a 48-hour week in January, 1914, at the same time instituting a profit-sharing plan. The result was a 15% to 20% increase in weekly output.

The other plant, manufacturing machine tools, changed in 1915 from a 60-hour to a 48-hour schedule. This plant reported:

We have been running under the eight-hour day for the past five years, and we are satisfied in our own minds that it is a success; for we know, from actual records, that we obtain a larger output than that obtained under the ten-hour day schedule.

A manufacturer of farm machinery emphasized the influence of the contentment of the workers on output:

We have an increase in hourly output sufficient to more than offset the reduction in hours, or, in other words, to make an increase in the weekly output per worker. We attribute this condition to the fact that through our general welfare work—picnics, band concerts, vaudeville shows, "Safety First" campaigns, visiting nurse—we have established and maintained between the management and its employees a spirit of friendliness and good-fellowship which manifests itself in full cooperation and conscientious endeavor on the part of our workmen.

The experience of those establishments which have been able to increase weekly output points clearly to the fact that ability to increase production depended upon many factors, especially upon the fatigue element involved in the work, the efficiency of the management, and the cooperation of the employees.

Output Maintained

Sixteen establishments reported that they were able to maintain weekly output. Thirteen of these establishments were in the 48-hour group, one in the 45-hour group, and two in the 44-hour group.

The ability of these establishments to maintain weekly output depended primarily upon the character of the work, which in most cases, due to the absence of the fatigue element, permitted increased effort on the part of the workers under the shorter hours. The installation of new machinery, speeding up of machinery, more efficient methods of management, increased effort of the pieceworkers, and increased contentment of the workers, were important factors which also contributed to the ability of individual plants to maintain their previous weekly output under the reduced schedule.

A manufacturer of plumbing supplies attributed maintenance of output to the installation of piecework:

Since the time of change in hours our weekly production per worker has been nearly as great as it was under the 55-hour week. The reason for this unusual condition, as the writer sees it, is the fact that previous to that time we had a limited number of piecework operations, and the establishment of piecework on all operations where possible made each individual operator speed up. Even the non-productive and productive dayworker speeded up in order to keep pace with his fellow worker. He could physically afford to do this because of the shortened hours.

A lamp company reported, as follows:

New and improved machinery is constantly being tried and installed, and in consequence the weekly output is as great, if not a little greater, under a 48-hour week than it was under a 54-hour week. This is due to improvements in methods and management and a more satisfactory piecework system. Most of the work is done by the piece. The workers, both men and women, are young and healthy, and work rapidly and steadily.

One plant, whose foundry only was affected, explained that production was maintained by having the sand cut over at night so the moulders could start working promptly at eight o'clock in the morning.

A wagon company, which changed from a ten-hour day to a nine-hour day in 1918, and from the nine-hour day to the eight-hour day in 1919, reported that previous output was practically maintained:

While it is possible there may have been some slight reduction in machinework, upon the whole we see no appreciable reduction in our output, and we are decidedly of the opinion that it is better to work men eight hours, even though the amount paid be the same, than to work them either nine or ten hours.

A large shipbuilding plant attributed the maintenance of output to new methods which improved the quantity and quality of production, with no greater exertion on the part of the workers.

An establishment manufacturing castings reported:

We had an increase in hourly output sufficient to offset the reduction from nine to eight hours. It is our opinion, however, that one great reason for this result was that our production per man per day was altogether too low under the old conditions.

A manufacturer of printing machinery stated:

When we reduced our shift from 48 to 44 hours, with an increase of 10% in all rates to keep the wages at the same level, we noted a reduction in production. This has since improved, and we feel that now we are obtaining about the equivalent of the former 48-hour production.

A stove manufacturing establishment reported:

So far as we can see, there has been absolutely no loss and a possible increase in the productive capacity of the plant.

Another stove manufacturer said:

We have watched very closely and find that, with but very few exceptions, we were able to turn out as much finished product under the eight-hour day as when we were working nine hours. Our business is run almost entirely on a piecework basis, and when the men understood that the change would be made, they were more than ready to speed up and try to make up the amount of their weekly earnings. We found in a few instances that a workman would put in a little extra time at his lunch hour rather than fall behind on his daily output. Our experience has been so satisfactory with the 48-hour week that we have no reason for thinking of any change.

A package machinery manufacturer stated:

When we made this change there was no noticeable change in production. This would indicate that there was a decided increase per hour. In other words, the increase in hourly output offset the reduction in hours. We have noticed a constant improvement since, from a production standpoint.

One plant, manufacturing railway freight cars, with 100% pieceworkers, reported as factors responsible for its maintenance of output, the speeding up of machinery where possible,

increase of equipment to take care of all work without interruption, and closer co-operation between departments.

Less Than Proportional Decrease in Output

Twenty-one plants decreased production less than in proportion to the reduction in hours. Eighteen of these establishments were in the 48-hour group, one in the 45-hour group and two in the 44-hour group.

All but two establishments reported no change, or an increase in the contentment of the workers.

Two-thirds of the establishments reported that they were better able to increase hourly output in certain departments or certain processes than in others. Thus, four establishments reported handwork output increased more than machine-work output, six establishments reported piecework output maintained and daywork output decreased, and four establishments cited certain departments in which the effects of the reduction in hours were especially noticeable.

In four cases a bonus plan was in operation.

A stove manufacturer reported:

When we changed from the ten hours to the nine hours about ten years ago our output was not reduced. Two years ago, when we made the change from nine hours to eight hours, our output was reduced, although not very much.

One establishment, manufacturing magnetos and storage batteries, stated:

This change was made January, 1916. Originally we were working 60 hours a week; we tried out the 55 hours per week with no reduction in pay and found that we had no decrease in production. The next step was the drop to 48 hours, and the reduction in production was equivalent to about one-half hour per day.

However, general conditions throughout the factory seemed to be improved to such an extent that we felt it worth while to continue on the 48-hour per week basis. We run an open shop and have never found it necessary to deal with the shop committee; we have no piecework, but keep fairly accurate production records and rate our operators in accordance with the amount of work turned out. This year we started a bonus system, which has worked out to our entire satisfaction.

Another stove manufacturer stated:

Our experience with the eight-hour day schedule has been to cause the pieceworkers to speed up their output to about equal that on the 60-hour week. By speeding up they give us a more defective class of goods.

An establishment manufacturing railway cars reported:

Production maintained except on machines where the output is governed by the speed of the machine.

A tool manufacturing establishment operating five days a week, stated:

Although it is not expected that employees working on a 45-hour basis can and will accomplish as much as they can and will accomplish in 50 hours covering 6 days or $5\frac{1}{2}$ days, the writer knows from experience that they do accomplish more per average hour and work more cheerfully because of the Saturday holiday than they did previously.

It was characteristic of the group of establishments which decreased weekly output less than in proportion to the reduction in hours (1) that in the departments where handwork predominated or where a large amount of physical exertion was required the workers were better able to increase hourly output on the shorter schedule, (2) that piece-rates and bonus systems were in a large number of cases an incentive to increased effort on the part of the workers, and (3) that the increase in hourly output was in practically every case accompanied by no change or by an increase in the contentment of the workers.

Proportional Decrease in Output

Thirty-one establishments reported a decrease in weekly output proportional to the reduction in hours, or a maintenance of hourly output. Twenty-seven of these establishments were in the 48-hour group, two in the 45-hour group, and two in the 44-hour group.

Practically every establishment reported a general decrease in production throughout all departments of the plant. With one exception no significant changes in equipment or management were reported. One establishment reported an increase in the number of pieceworkers, but this apparently had no effect upon output.

In a few cases increased contentment of the workers was noted, and a few establishments reported greater dissatisfaction among the employees, but on the whole little change in the attitude of the worker was evidenced.

An establishment manufacturing linotype machines reported its experience as follows:

For a number of years we have operated on a 48-hour basis. Due to labor difficulties and the fact of our competitor going on a 44-hour basis, we of necessity had to do the same.

It is difficult to advise regarding the difference in production between 44 and 48 hours, and personally we do not feel that there is any increased efficiency compensating for the time lost. We have, however, absolutely insisted on better discipline and on the employees being at their stations ready for work when the bell rings. Possibly in this direction we have improved the situation, and we are consistently endeavoring to put more work on a piecework basis with a view of securing an incentive for greater production.

A manufacturer of cast-iron meters stated:

Production per hour on 48-hour week is just about on a par with production on 55-hour week, with higher wage per hour required.

An establishment manufacturing steel gears and pinions reported experience with varying schedules of hours:

Within the past year, we have worked on three schedules of hours: 48 hours day and 48 hours night, our normal standard; 42½ hours day and night, applied for a number of months when work was very slack; and 53 hours day and 60 hours night at present, as emergency measure to increase production. Times are allowed and premiums offered for production, and while we have studied the matter carefully, we cannot find but that under all three schedules the premiums earned are practically proportionate to the hours worked.

A plant building yachts and boats reported as follows:

So far as we are able to tell, the reduction in output resulting from the change to 48 hours per week from 54 was roughly in proportion to the reduction in time. In other words, the reduction did not, as a matter of fact, increase the efficiency of the men, and it is our opinion that the general efficiency of labor in this plant was very much reduced during the war period. It has somewhat improved since the end of the war, but the increase is by no means sufficient to offset the loss in time.

Greater Than Proportional Decrease in Output

Sixteen plants, all of them in the 48-hour group, reduced hourly as well as weekly output.

In practically every case other causes were emphasized as contributing largely to the decrease in production. Chief among the reasons named were the scarcity of labor, lack of ability to enforce discipline among the workers, general labor unrest, and the attitude of workers created by the rulings of the War Labor Board.

A number of plants reported also a decrease in the quality of production.

In three-fourths of the cases very few or no pieceworkers were reported, though a number of the establishments reported a bonus system.

An establishment manufacturing gasoline engines made the following comment:

We are strongly of the opinion that too great a reduction in hours of work is much worse for the workman than a moderate amount of additional hours. A workman going home at 3 o'clock or 4 o'clock in the afternoon is left with a large amount of idle time on his hands, and the habit of idling becomes fixed upon him so that it becomes difficult for him to take hold of real work, and to work even at the average rate.

We are now operating our plant, employing normally about 160 men per each eight-hour shift, upon an eight-hour day basis or forty-eight hours per week. This was instituted at their request in place of a nine-hour day, and at that time three eight-hour shifts were organized, operating twenty-four hours per day. Absolutely no beneficial results have ever been noticed. Take the little matter of quitting at the end of the day; it takes just as much effort as it did before to make the men work until the whistle blows, they having just as much tendency to stop several minutes before the whistle blows and begin to clean up.

Our production per man-hour has actually dropped off, but this may be partly due to the general unrest and the efforts of the labor unions to prevent a man from doing a full day's work.

A shoe machinery manufacturer stated:

When we dropped to 50 hours per week some two years ago, we saw no improvement in efficiency or in the quality of the work produced, but we have experienced a falling off in production per hour which has been more or less general ever since we reduced our running time from 52½ hours, and our experience, in some cases at least, is that men now working 48 hours per week who formerly worked 52½ hours per week, and who are now getting much more for 48 hours than they did for 52½ hours, actually are producing less work per hour and have much less interest in their work than formerly.

While we do not claim that the reduction in hours is the cause of this condition, we are positive in our belief that the reduction in hours has had no tendency to improve that condition, but has worked otherwise.

A manufacturer of locomotive cranes stated:

Total reduction in output was about 25%, with all but 10% due to other causes.

An establishment manufacturing drills and lathes reported:

Our records show about a 27% falling off in production, but we attribute 20% of this to slowing up of business and labor unrest.

Decrease in Output—Amount Not Stated

Twenty-four establishments reported a decrease in output accompanying the change in hours, but did not give the amount of such decrease.

CONCLUSIONS FOR METAL MANUFACTURING

1. Over one-third of the metal manufacturing establishments studied were able to increase hourly output on a schedule of 48 hours or less, half of this number sufficiently to maintain or increase the production obtained on their previous schedule of hours.

2. Although most of the plants investigated were operating on a 48-hour week, practically the same proportion of establishments increased or decreased hourly output on the 45-hour or 44-hour week as on the 48-hour week.

3. The ability of a plant to increase hourly output depended largely upon the kind of work performed. In many of the plants requiring heavy physical labor, it was possible for the workers to increase their efficiency on the shorter schedule of hours. In other branches of the industry where light machine operations predominated, the amount of handwork as contrasted with more purely automatic machine work in any process largely determined the ability of the workers to increase hourly output.

4. Marked changes in output, however, were in most cases influenced by other important factors. Increased

efficiency in methods of management and the installation of new machinery were directly responsible for large increases in production.

5. The piece-rate system was apparently more conducive to increased efficiency than was the day-rate system of wage payment in the plants where the work was of such a nature that piecework could be advantageously used. In many cases pieceworkers are reported as maintaining their previous weekly output, whereas dayworkers showed a substantial decrease in production. In half of the establishments, however, very few or no pieceworkers were reported. Many of the plants reported a bonus system in place of piece-rates, which in certain cases proved an incentive to increase production.

6. In this as in other industries the morale of the workers evidently had a very direct bearing upon the ability of a plant to maintain output. Increased contentment of workers was reported in most of the establishments where hourly output was increased, and greater dissatisfaction of workers in those establishments which reported a falling off in hourly as well as weekly output. For the most part those establishments reporting no change in hourly output reported also no change in the attitude of the workers.

GENERAL OPINION ON LENGTH OF WORK WEEK

The opinion of the various manufacturers on the hours-of-work problem represented only their individual experiences with the different schedules of hours, but were illuminating insofar as they showed the varying problems in special branches of the industry.

A manufacturer of marine engines expressed the opinion that an eight-hour day was unnecessarily short for the specialized kind of work in his plant:

During the war we operated our plant on a 44-hour base week and 55-hour working week, paying overtime for hours over a forty-four hour week. After the war, when our production had satisfied the most acute demands for delivery, we eliminated overtime. We put the question to our men of remaining on a 44-hour week on straight time or a 48-hour week on straight time, and our men elected the 48-hour week on straight time.

You will note from the figures we have given that our works manager estimates that a 55-hour week would be most satisfactory. This is based on the assumption that this would be most satisfactory to our men. In the writer's opinion, it is impossible to lay down a definite number of hours per week for all men in any particular industry, either from the viewpoint of maximum efficiency of production or the viewpoint of fatigue or health. In our particular case, we are really not manufacturers, from the standpoint of multiple production. Many of our machining processes are conducted on large pieces, with several hours in each process. There is opportunity in the bulk of our work for long periods of rest between operations. Accordingly, it is not possible for a man to become fatigued to the extent that is true in operations in the automobile industry, for instance. The beginning of the year 1919, we established our own dispensary and medical service and gave a far greater degree of attention to safety work and the health conditions of employment of our men. Accordingly, there was a considerable reduction in the number of accidents and a tremendous reduction in the seriousness of these accidents.

We believe that in all cases of work which involve practically continuous operations, the eight-hour day is long enough. For example, we find that that is as long as a man can effectively work in our foundry, and that he actually does suffer from fatigue when worked a greater number of hours. Furthermore, much depends on whether the men are driven or not, that is, whether process work in the plant is of such a character that the men must actually keep up to a certain rate of production or interrupt the entire process. There is no doubt but what men become fatigued more readily under these conditions, and only the best physical types can continue without frequent absences or an increase in accidents.

An establishment making bronze bearings supported the eight-hour day for that particular kind of work because of the fatigue element involved:

Our impression of the eight-hour day covers a continuous period of nearly five years, and in our particular business we feel that it is the ideal day. In reality we work $8\frac{3}{4}$ hours per day and one-half day Saturday, making 48 hours per week.

We feel that each business is slightly different, and the nature of the business must be taken into consideration when the hours of work are planned.

Most of our work is fairly tiring, from a physical standpoint, and we believe that this number of hours is sufficient to enable the men to do a good reasonable day's work, and yet not so long as to overtire them.

We have a few men, like watchmen, who have absolutely nothing to do but open a gate, or sit around and read most of the day, and these

men work twelve hours per day, which we feel is consistent with the eight hours that the eight-hour man is working on a job requiring considerable physical energy.

There are some few very intensive jobs, such as in furnace rooms of certain lines of industry, where the physical exertion is exceedingly strenuous, and we imagine that something less than eight hours should constitute a day's work, although we have had no experience in this line and would not care to venture an opinion.

A manufacturer of roller bearings also recorded that in his opinion the 48-hour week was most satisfactory in industries of that general nature:

Our experience leads us to believe that a reduction to 48 hours in industries similar to ours is advantageous, increases the hourly rate of production, benefits the health of the employee, and improves the morale of the factory as a whole.

It is, of course, impossible to say in any particular industry that the eight-hour day is ideal, and prove it conclusively. We are, however, convinced, from our experience, that any day materially shorter than eight hours is not beneficial in our line of work.

Two establishments reported a tendency of labor to work a greater number of hours.

One, a machine manufacturer, reported:

There seems to be a pronounced tendency among workers seeking employment to increase the number of hours. Short hours appeal to women who have other means of support. Male workers are now asking more particularly how many hours per day we work, rather than the price per hour. We find this condition even among union men.

The other, a manufacturer of stationary engines, stated:

Under our present conditions the eight-hour day works very satisfactorily, in that we are able to operate our plant sixteen hours each day. For the past several months, a great many of our men have made the request to be allowed to work ten hours per day. They were willing to do so on straight time. In checking over the pay-rolls for last month I find that 20% of our machine operators, 40% of the floor men, and 50% of the blacksmiths, all pattern makers, and 50% of the woodworkers worked ten hours per day of their own volition. This convinces me that they do not feel that ten hours is excessive.

A manufacturer of sewing machines advocated the 50-hour week:

I believe the length of time an operator should work depends upon the nature of his or her task and the resulting physical or mental strain it brings about—in other words—the amount of fatigue each day.

This must necessarily vary widely in various occupations, and speaking only of the occupations in this plant, which can be generally described as light machining and assembly operations, I believe 48 hours a week is unnecessarily short. The investment in plant equipment for highly technical operations such as ours, and such as is largely found in this kind of work, is so great that 48 hours a week is too short an operating time. The result is higher first costs due to the additional overhead. If the human being were benefited by this shortened operating period the increased costs would be well worth while. I cannot see that they are.

Our experience in operating all this machinery, first on a 54 hours a week basis, and then on a 48 hours a week basis, is, to put it conservatively, that we lose five hours production per week. The advocates of the shorter week reply that the investment can be turned over by working in shifts; but in practice this is not feasible. Some continuous operations, like furnaces, can work in shifts, but machining and assembling operations can do so only at a decided disadvantage, assuming the help can be obtained to fill the shifts. Another trouble here steps in—our social structure is such that everybody wants to work, play and rest during the same periods of the day, with the result that because of our city transportation facilities, those who may be willing to work in the out-of-the-ordinary time shifts cannot reach their job.

For welfare reasons I believe the Saturday half-holiday the year round is greatly to be desired, and, looking at the subject from every angle, my standard time for industries of the character of which I am speaking would be the 50-hour week, operating nine hours five days, and five hours Saturday morning.

A shoe machinery manufacturing concern stated:

We believe that in a manufacturing plant like our own we have gone below the safety line in hours. The best service we ever obtained was on $52\frac{1}{4}$ hours per week.

A large automobile establishment favored the eight-hour day.

Under normal conditions, that is, where the worker is willing to give his best effort, I believe the eight-hour day will give us results equal at least to the nine or ten-hour day, owing to the greater efficiency of the workmen.

VIII

MISCELLANEOUS MANUFACTURING INDUSTRIES

Data were secured from 94 establishments, representing 16 miscellaneous industries, and employing about 56,861 workers. Those establishments were included in this group which were too few in number to be considered representative of the industry to which they belonged. The various industries, however, have been treated somewhat in detail, so far as possible, in order to show any special tendencies in them.

The various industries represented in this group, and the number of establishments in each industry, are listed below:

Rubber Products (druggists' rubber goods, rubber footwear, tires, tubes, rubber mechanical goods, brake linings)	15
Knit Goods	15
Clothing (suspenders, neckwear, elastic webs, corsets, working clothes, shirts, trousers)	14
Paper Products	10
Dyeing and Finishing	9
Jute	7
Lumber	5
Food Products (biscuits, candy and sugar)	4
Paints and Varnishes	4
Furniture and Interior Fixtures	3
Insulated Wire	3
Brushes	1
Harness	1
Hardware and Advertising Specialties	1
Inks	1
Printing	1
Total	94

CHANGES IN WORK-WEEK SCHEDULES

Of the 94 establishments, 72 reduced to 48 hours per week. Schedules of the remainder varied from 47 to 43 $\frac{1}{3}$ hours.

The 5 $\frac{1}{2}$ -day week prevailed throughout practically the whole group.

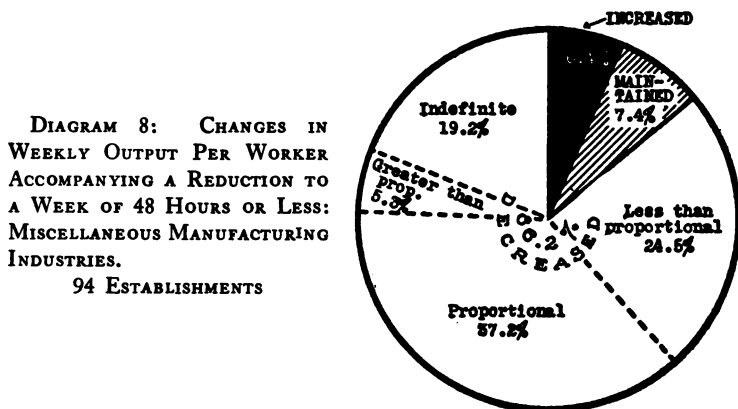
The previous work-week for a majority of the establishments reducing to 44 hours was 48 hours. In the 72 estab-

lishments which reduced to 48 hours per week, the previous schedule of hours ranged from 49½ to 60 hours. Seventy-two hours per week was the schedule of one plant that changed from a two-shift to a three-shift basis. In most cases, however, the change was from a 54-hour week.

CHANGES IN OUTPUT ACCOMPANYING REDUCTION IN HOURS

Of the 94 miscellaneous manufacturing establishments, six succeeded in increasing weekly output, seven were able to maintain weekly output, and 81 suffered a decrease in weekly output. Twenty-three plants showed a decrease in weekly output less than proportional to the reduction in hours; 35 plants maintained hourly output and therefore decreased weekly output proportionately to the reduction in hours. Five plants decreased weekly output more than in proportion to the reduction in hours.

Changes in output in this group are shown in the following diagram:



In Table 15 are shown the number of establishments and percentage of total employees in all establishments included in each group reporting changes in output:

**TABLE 15: MISCELLANEOUS MANUFACTURING INDUSTRIES:
CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING
REDUCTION TO A WEEK OF 48 HOURS OR LESS**

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establish- ments Reporting	Percentage of Total Employees in Group
Increased	6	7.2
Maintained	7	3.4
Decrease, less than proportional to the reduction in hours	23	45.5
Decrease, proportional to the reduction in hours	35	22.8
Decrease, greater than proportional to the reduc- tion in hours	5	4.0
Decrease, amount not stated	18	17.1
Total	94	100.0

48-Hour Week

The following table shows how output changed in those plants reducing to a 48-hour week:

**TABLE 16: MISCELLANEOUS MANUFACTURING INDUSTRIES:
CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING
REDUCTION TO A 48-HOUR SCHEDULE**

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establish- ments Reporting	Percentage of Total Employees in Group
Increased	4	9.9
Maintained	4	3.6
Decrease, less than proportional to the reduction in hours	18	25.4
Decrease, proportional to the reduction in hours	27	31.2
Decrease, greater than proportional to the reduc- tion in hours	4	5.0
Decrease, amount not stated	15	24.9
Total	72	100.0

45-Hour Group

Changes in output in the group of plants reducing to a 45-hour week are shown in the following table:

**TABLE 17: MISCELLANEOUS MANUFACTURING INDUSTRIES:
CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING
REDUCTION TO A 45-HOUR SCHEDULE**

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establish- ments Reporting	Percentage of Total Employees in Group
Increased	0	0.0
Maintained	0	0.0
Decrease, less than proportional to the reduction in hours	2	95.3
Decrease, proportional to the reduction in hours	2	4.7
Decrease, greater than proportional to the reduction in hours	0	0.0
Decrease, amount not stated	0	0.0
Total	4	100.0

44-Hour Week

The plants reducing to a 44-hour week reported changes in output distributed as shown in the following table:

**TABLE 18: MISCELLANEOUS MANUFACTURING INDUSTRIES:
CHANGES IN WEEKLY OUTPUT PER WORKER ACCOMPANYING
REDUCTION TO A 44-HOUR SCHEDULE**

(National Industrial Conference Board)

CHANGES IN OUTPUT	Establish- ments Reporting	Percentage of Total Employees in Group
Increased	2	11.6
Maintained	2	15.8
Decrease, less than proportional to the reduction in hours	3	49.4
Decrease, proportional to the reduction in hours	6	18.4
Decrease, greater than proportional to the reduction in hours	0	0.0
Decrease, amount not stated	1	4.8
Total	14	100.0

Besides those included in the above hour-groups, four establishments reduced to various other weekly schedules.

One establishment, reducing to 47 hours per week, reported a decrease in weekly output, but did not state the amount of the decrease.

One establishment, reducing to $46\frac{1}{2}$ hours per week, reported that weekly output was maintained on this shorter schedule. Hourly output was increased sufficiently to offset the reduction in hours.

One establishment, reducing to $43\frac{1}{3}$ hours per week, reported a decrease in output but did not state the amount of such decrease.

One establishment, reducing to $47\frac{1}{2}$ hours for men and 45 hours for women, reported a decrease in output greater than proportional to the reduction in hours, or a decrease in hourly as well as weekly output.

ANALYSIS OF CHANGES IN OUTPUT

Output Increased

The six establishments reporting an increase in weekly output covered several of the miscellaneous industries, namely, clothing, bleaching and dyeing, rubber footwear, and paints and varnishes. Four were in the 48-hour group and two in the 44-hour group.

All but one of the six establishments reported a large proportion of pieceworkers or a bonus system of wage payment. All establishments reported well-contented workers.

Two establishments making workingmen's clothing were able to increase weekly output on a week of 44 hours. The workers were able to speed up production under the shorter hours because of the handwork character of the manufacturing processes. A large percentage of the employees were on piecework.

The manager of one of these establishments made the following statement:

We formerly worked ten hours a day, then reduced it to nine, then to eight, and now work 44 hours per week. According to the old ten-hour plan, we found that nearly every week each girl took half a day off, and we were among the first in the city to inaugurate the Saturday half-holiday, first closing at four, then at one, then at 12:30 and finally at twelve o'clock. I often noticed that from 5:30 to six the

help were completely worn out and that they were dull and unfit for work the next day. We voluntarily changed the hours from ten to nine, more than twenty years ago. The writer was one of the committee to adopt eight hours, and in making the change from nine to eight, we actually got out more work in eight hours than in nine; the help were fresh, contented and better satisfied throughout.

The other establishment accounted for the increase in output as follows:

I try to study my help and encourage them to make all they can, making them feel that they are part of the concern. I am glad to say that we are turning out 10 per cent more work in 44 hours than we did in 48. The help are always fresh and they go about their work with a vim, and we do not tolerate slackers.

One bleaching, dyeing and printing establishment reported an increase in weekly output which the management inclined to credit to a new system of industrial democracy instituted at the time of the adoption of the 48-hour week.

A plant manufacturing rubber footwear was able to increase previous weekly output by means of improvements in machinery and in methods of management. The irregular hours of pieceworkers were also noted as explaining the maintenance of production. This plant was one of a group of eighteen similar plants under the same management, and the experience of this establishment was cited as indicating roughly what happened in the whole group.

Our production both per hour and per week per person has increased considerably, and this increase can be laid almost entirely at the door of new methods. In our industry employees go home when finished with their piecework and there was considerable short-time on 54-hour basis. On going to a 48-hour basis, this amount of going out early was reduced, so that we are perhaps peculiar in the results that we got from a 48-hour week.

Two establishments, making paints and varnishes, were able to increase weekly output on the 48-hour weekly schedule. No pieceworkers were employed in these two plants. One was a small establishment employing only nine workers. The management stated that the work in this plant required a considerable amount of hand lifting and that the better physical condition of the workers enabled them to increase output under the shorter week. The quality was also somewhat improved.

The other establishment granted a bonus to employees for thrift and length of service. This plant had a "Congressional Plan" of shop committee.

The factors which tended to increase efficiency so markedly in this group of establishments were (1) the fatigue element in certain industries which made it possible to do more and better work in a shorter than in a longer day, (2) contented employees, (3) improvements in equipment and methods of manufacturing, and (4) piece-rate or bonus systems of wage payment.

Output Maintained

The seven establishments which were able to maintain weekly output included clothing, rubber, knit goods, jute, dyeing and finishing, and paint and varnish manufacturing plants. Of these, four were operating 48 hours, two 44 hours, and one 46½ hours.

A large proportion of pieceworkers was reported by all but two of these establishments. These two plants employed bonus systems. All of the establishments reported the workers well satisfied, or with increased contentment due largely to the shorter hours. In two plants the increase in output was probably due in part to improved machinery and to a reduction in the number of styles manufactured.

The two clothing establishments reported that their weekly output was about the same on a 44-hour week as on a 48-hour week. One reported a few improvements in machinery. Both employed over 75% pieceworkers.

An establishment manufacturing mechanical rubber goods reported its experience in the following statement:

Ours is the only rubber factory in the Northwest that has had any continuous operation over a period of years. Consequently, there is no rubber labor market here and the bulk of our help has had to be trained in our own plant. There is, therefore, no organization among the employees either from within or without.

In shortening our hours of labor from 54 hours per week three or four years ago, to 46¼ hours now, we have to a large extent simply anticipated the expected request of our employees and have endeavored to meet the shortened week by improved efficiency. The most satisfactory change we have made has been the inauguration of a five-day per week schedule, leaving the workmen free for 48 hours,

leaving the factory free for repairs, and giving the office a breathing spell in which to check up on Saturdays.

A large woolen hosiery manufacturing establishment reported the following experience with a 48-hour week:

It is somewhat difficult to account for the fact that as large a production has been maintained under the 48-hour schedule as under 54 hours with practically the same number of employees. It is the writer's opinion that the average piece-rate worker has in mind to earn about so much a week, whether the hours are 48 or more. This applies not only to piece-rate workers but to hour-rate workers, there being apparently a general speeding-up throughout our plant when the change in hours was made. This has been maintained up to the present time in every department, with the possible exception of carding, where the output depends largely on the speed of the machines rather than the speed of workers. That full production is being maintained generally and in some departments by the same identical personnel of employees as under the 54-hour schedule, is clearly shown by our figures.

We simplified our conditions somewhat by marketing fewer styles, and also have made some progress in standardizing the put-up of our goods.

Approximately 90% of the workers in this plant were on a piece-rate basis, and a 5% attendance bonus had been instituted.

A jute manufacturing establishment, reporting that weekly output was maintained, operated part of the plant on two shifts per day and had about 75% pieceworkers. This establishment had a shop committee which assisted in the management of the plant. The agent of this plant reported that all departments were producing about the same amount of material on the 48-hour week as they did on 54 hours.

The two remaining establishments maintaining output operated on a 48-hour week, the one a dyeing and finishing plant, and the other a paint and varnish manufacturing establishment. No pieceworkers were employed by either establishment, but both reported bonus systems. Regarding its attendance bonus, the management of the dyeing and finishing plant said:

This has had a pronounced effect in making the employees regular in their attendance and insures their being at work at their machines when the whistle blows.

Less Than Proportional Decrease in Output

The group of 23 establishments reporting a decrease in weekly output less than proportional to the reduction in hours, included clothing, dyeing and finishing, candy, jute, knit goods, harness, ink, paper, and rubber manufacturing plants.

Eighteen of these establishments reduced to 48 hours per week, two to 45 hours per week, and three to 44 hours per week.

Two-thirds of the establishments reported a majority of pieceworkers, and a large number of these establishments reported a greater increase in the hourly output of these workers than of the dayworkers. In seven cases this increase was sufficient to maintain previous weekly piecework output. The other plants for the most part reported an increase of hourly output in handwork, but no increase of hourly output in machine work. Very few establishments reported the same general decrease throughout all departments of the plant.

With one exception, all establishments reported either no change or an increase in the contentment of the workers.

In a number of establishments the speed of the machinery had been increased as an aid to production.

Nine establishments reported some form of bonus, which evidently proved an incentive to increase production. In most cases both hourly wages and piece-rates were increased, but three establishments reported piece-rates unchanged, which may have had a bearing on the maintenance of output by the pieceworkers in these plants.

The management of one dyeing and finishing establishment, where only the hours for women were reduced, stated:

We do not find that the women produce as much in 48 hours as they did in 54, although the decreased production, because of the loss of six hours, is not proportional. The pieceworkers on the whole have made a better showing in production than those on hourly rate. Probably 60% of our girls are on piecework and 40% on hourly basis.

One ink and carbon paper manufacturer emphasized the influence of handwork and piece-rates on the maintenance of production:

The women are really the key to the production. They are the finishers, and are on piecework, and the function of the men is almost exclu-

sively to keep the women supplied. Handwork predominates in our production, although we have a varied line of semi-automatic and other machinery. Where much machinery and particularly automatic machinery is used, the production is decreased where time is reduced, but where hand labor is largely used there is always some slack that can be taken up. The reduction in hours did not make any difference in the production of the experienced and best pieceworkers among the girls, but this is not true of the newer girls taken on, who simply adapted themselves to the time they found in force.

The following statement was made by an establishment manufacturing fine knit underwear. This establishment reported only a slightly increased hourly output:

This company changed from a 54-hour to a 48-hour schedule the year before the war. Our reason for doing so was that we found our employees would be better satisfied with that schedule, and we had a hope that practically the same amount of work would be done in the shorter week as was done in the longer one. At the time the change was made, an increase in pay, both in piecework rates and for day labor, was given, practically equal to the reduction in hours, with the idea that if the much-talked-of principle of being able to do as much work in eight hours as is usually done in nine were true, we would be giving our employees the benefit of that extra earning capacity.

We have always had, and are having today, the best support from those we hire. Our people are not open to the criticism of being "slackers," but a term of years has proven that, in the knitted-underwear business, the idea of doing as much work in eight hours as in nine is preposterous.

We are losing about eight per cent. of our production by the change of time. While employees prefer the shorter working day, and we expect to continue it, we do not believe it added in any perceptible way to their physical or mental welfare. We employ about 400 hands, about 75% of them being women, and fully that percentage working on a piecework basis.

Another establishment manufacturing knit underwear and sweaters made the following statement:

Our output decreased slightly less than 5% over a stretch of practically a year. The decrease in working time being about 6%, there is a variation of 1%, which is chargeable to slightly increased efficiency. The loss of 5% in production is directly attributable to the decrease in working hours.

Proportional Decrease in Output

The 35 establishments reporting a decrease in output proportional to the reduction in hours, included: brushes, clothing, dyeing and finishing, biscuits, furniture and interior fixtures,

insulated wire, lumber and woodworking, paper products, printing, rubber products, jute, and knit goods manufacturing industries.

Twenty-seven of the 35 plants reduced to 48 hours per week, two to 45 hours per week, and six to 44 hours.

With the exception of the clothing, rubber, jute and knit goods establishments, the industries in this group employed very few or no pieceworkers.

A large proportion of the establishments reported that machine processes predominated and that, therefore, production had been reduced in proportion to the reduction in hours. In a few cases the speed of the machinery was increased, but this increase in speed seemed to have no material effect upon hourly output. Most of the establishments reported a general decrease in production throughout the plant.

A large majority of the establishments reported no change in the attitude of the workers, though evidences of general labor unrest were noted in a number of cases.

One paper manufacturer described the machine-time character of the manufacturing processes in his plant, as follows:

This plant manufactures coated paper. We do not make our own raw stock. This paper is run through a coating machine and down lines for drying, going down the length of the room on one track, around a switch, back again the same length of the room on another track, where it is reeled. This machine can only go at a certain speed. Therefore, taking off any hours per week lessens the production just that much. From the coating room the paper goes down to the finishing department where it is calendered—this being entirely a machine proposition also—and goes at a speed depending entirely on the character of the paper made. The shortening of the hours of labor reduces the production just as much. The same is true of the cutting department where the paper is cut from the rolls into sheets. Then it goes to the sub-cutting department where it is trimmed on all four sides of the sheet. This is all machine work—all done by men.

One clothing manufacturing establishment stated:

We do not get any more production in the 44 hours of work than we did in the same length of time when we worked 54 hours.

Another reported:

As to the operation of a 44-hour week, we have not noticed any increased production per person since we have gone on this basis, but in general our figures show us that we are producing one-twelfth less physical volume of goods with the same number of people as when we operated a full 48 hours.

Four lumber mills located in one city on the Pacific coast reported a reduction from 60 hours per week to 48 hours per week and a decrease in weekly output proportional to the reduction in hours.

A jute manufacturing establishment reported:

You will note that the reduction in output in our plant is the same as the reduction in hours of work. In other words, the production is limited by the speed of the machines, which cannot be increased, and by the number of machines which a worker can tend. Our experience indicates that a worker can tend no more machines in the 48-hour week than he can in the 54-hour week; therefore, the production is decreased in proportion to the decrease in hours.

Greater Than Proportional Decrease in Output

The five establishments reporting a decrease in weekly output greater than proportional to the reduction in hours, included one plant manufacturing biscuits, one manufacturing lumber products, two manufacturing rubber goods, and one knit goods manufacturing establishment. Four of the five establishments were operating 48 hours; the other 47½ hours for men and 45 hours for women.

Only two of the five establishments reported the piece-rate system of wage payment. One establishment, a cracker and biscuit factory, had a large proportion of pieceworkers. New machinery had been installed which should have increased output, and a bonus was paid for full attendance, but a decrease was noted in hourly output and also in the quality of production. The workers in this plant were somewhat handicapped by a poorly-lighted building, and a large labor turnover was reported. The management in this case stated that output would have suffered a still greater loss if it had not been for the pieceworkers.

A lumber mill reported its experience as follows:

Our experience is that our production per hour is not increased one particle over our ten-hour production. We proved that we are manufacturing as much per hour as we were before, but not one bit more. This is true where we are operating machinery. On the outside where it is simply a process of handling by man power, our production is less per hour than it was on the old ten-hour system.

A plant manufacturing fire hose reported:

Our weekly output per worker decreased. It was not possible for us to speed up the machines because of their peculiarity. Not only did

our output for 48 hours decrease over that of 54 hours, this output naturally being attributed to the shorter number of hours, but it also decreased because, after the machines were once ready to run, there were fewer hours to run them. Since August first we have carefully studied the causes of decreases in production below that which would naturally come from the decrease in working hours, and we came to the conclusion that we can get back to a normal production of 48 hours only by changing our working schedule for all men to 9½ hours per day with no work on Saturday. This may be a peculiarity in our business, due to the length of time required for vulcanization of the rubber. On our present schedule of 8¾ hours per day there is practically no work for the last three quarters of an hour, because the vulcanization heat cannot be completed before closing time. We explained this situation to our employees and the men unanimously agreed to the 9½ hours schedule per day, with no work on Saturday. . . . We do not believe that a total of 54 hours works a hardship on any employee. Before the 48 hour schedule went into effect it was stated that the production would be equal to, if not greater than, the 54 hour schedule, because the employees would be in better health and would be able to do their work with more vigor. In our particular case we find that the opposite has prevailed.

Three of the five establishments in this group reported dissatisfaction on the part of the workers. One reported that the make-ready was an important item, and that the actual length of time the machines were run was decreased relatively more than the nominal hours.

CONCLUSIONS: MISCELLANEOUS INDUSTRIES

In this study no attempt was made to analyze the experiences of the various individual industries represented. The following findings with respect to special industries may, however, be noted:

A large number of establishments manufacturing working clothes showed remarkable ability to increase hourly output even on a reduction to a 44-hour week. Several establishments manufacturing rubber goods were able to increase hourly output under a schedule somewhat less than 48 hours. A relatively large number of knit goods establishments were able to increase hourly output, in only one case, however, to the extent of maintaining previous weekly output.

A few outstanding features, moreover, seemed to be characteristic of the whole group of miscellaneous industries. These characteristics may be summarized in a few statements:

1. In those industries in which output depended to a large extent upon the skill of the worker, the various establishments were better able to maintain production under the shorter hours than in those industries where machine work predominated. Wherever the element of fatigue entered in, either as the result of hard physical labor or of close application, shorter hours tended to decidedly increase the hourly efficiency of the workers.

2. Piecework tended to increase hourly output unless the rate of production was controlled by the speed of the machinery.

3. Wages in general had no definite effect upon ability to maintain output. In several instances where an attendance bonus was paid, however, the workers showed a tendency to increase hourly output.

GENERAL OPINION ON LENGTH OF WORK WEEK

The following are excerpts of opinion of various individual manufacturers on the changed working schedule:

A dyeing, printing and finishing establishment made the following report:

I wish to state that it is my personal belief that the 54-hour week was better adapted to our plant than the 48-hour schedule now in vogue. A print works is somewhat different from other factories, because of many drying operations that are needed. Before we can reach the full speed of our machines, the drying cans must be heated to the proper extent, and it is some little time every morning before we can get our full output from machines of this type. The same thing is true of the printing machines, from which the very large proportion of our product is obtained. A short day is detrimental to best results. It takes a considerable length of time to make changes from one pattern to another, or from one color combination to another, but when we get under full running headway a good showing is made, and it is usually the case that toward the latter part of the day the printing machines run more steadily than at any other period. The result is that when we are obliged to stop at four o'clock, as is the case at present, the loss of product sustained is considerable. This fact is so well recognized in many plants, both in this country and abroad, that it is quite the usual custom to increase the running time the first five days of the week, and stop on Saturday altogether.

It is the general impression that to start up on Saturday morning is a mistake, as it is well on in the morning before the machines can get

into proper running order, and then they are obliged to stop at 12 o'clock. This makes such a short day that, relatively speaking, a small product is obtained, compared with a full day's run. It is for this reason that the extra time is worked on the first five days of the week. Nearly every concern that has tried this plan has found that better production is a result. We have not attempted it at this plant, but the writer had some experience in this direction in the plant where he was formerly employed, and found that it worked satisfactorily.

As regards its being the real wish of our employees to work fewer hours—that is, to run 48 hours per week rather than a 54—it is my impression that what they are mainly after is to work fewer hours on regular time and work the extra number of hours and receive time and one-half for same. We find no difficulty now in prevailing upon our help to work extra hours. In fact, in many instances they attempt to so arrange matters that they will be obliged to work extra. This was not true when regular rates only were paid for overtime work.

A cotton goods converting establishment stated:

We consider the 48-hour weekly basis very satisfactory for our own plant, and we have it divided in such a manner that the plant opens in the morning at 7:45, with a lunch period of three-quarters of an hour at noon time, work continuing until 5:15, with the exception of Saturday, when the hours are from 7:45 until 12:00. This gives the employees a half-day off each Saturday, and as near as we can find out, the employees are perfectly well satisfied with this basis.

A jute manufacturer expressed the following opinion:

We do not think that a 54-hour week, such as we had been running in Massachusetts up to June 1, last year, was injuring the health of any of our employees; and we are very certain that production is needed during the reconstruction period. We hope, however, that the world eventually will get on with 48-hour week. It was a bad time to try the experiment, and the constant pressure for a still shorter week is a very serious menace to the prosperity of the country. We believe positively that under present conditions and in view of the prospects in the next quarter of a century, the world should work at least 48-hours, and that it would be healthier, mentally, morally and spiritually than with a reduced working schedule.

A knit goods manufacturer reported:

We believe the problem of the high cost of living will never be solved until workers appreciate that it is their duty to produce more. It does not matter now what the schedule of working hours is, operators will make still less time and lower production. We believe that the 48-hour schedule is against the interest of the workers.

A paint manufacturing establishment reported as follows:

Our experience is that in almost all lines of manufacture nine or even ten hours of work is not excessive nor too exhaustive, and that

the eight-hour day not only causes a smaller output on account of less hours, but has a tendency to restrict quantity of production even in the smaller number of hours work. We judge from our own experience that while our men are not willing to work nine or ten hours as a regular day, they are perfectly willing to work eight hours with two hours overtime at time and a half, and they strenuously object to our cutting out overtime, which leads us to believe that it is not a question of ten hours being too long, but a desire to get more pay. We, of course, do not expect them to work ten hours for the same pay as for eight hours, but we do think the universal acceptance of the eight-hour day is a bad thing for all classes.

A bleaching and finishing plant reports a preference for a five-day week:

We should be glad to run our plant on a 48-hour schedule, to be worked in five days without any work on Saturdays. We are doing this now in some departments, but in others are unable to do so because of the number of women there employed, whom we are forbidden to employ for more than nine hours in one day.

If we could extend this time a very small margin, we should be able to give all our help a full day off each Saturday, which has been found pleasing to them so far as we have been able to do it, and affords a considerable saving to us in fuel (25 tons a week), an item quite important under present conditions.

A manufacturer of workingmen's clothing also reported a preference for a five-day week under conditions which existed in that state:

We have a state law which prohibits the employing of female labor in excess of 8 hours in any one day, and were it not for this law we believe a much better and more satisfactory 44-hour week could be arranged by having the workers put in 9 hours each on the first four days of the week and 8 hours on Friday and then close the plant entirely on Saturday. This arrangement would give the workers two days for rest and recreation and would tend to keep them more steadily on the job.

So far as the length of the work week is concerned, if all manufacturers were on the same basis, we would see no objection to a 44-hour week. It does, however, have a tendency, owing to the one-twelfth reduction in output it entails, to increase the overhead expense in competition with other concerns in the same line of business operating 48 hours per week. The 44-hour week affords the workers one-half day each week for shopping, medical and dental attention, and probably has a tendency to do away with absence from work of even a longer period during a week where the factory is run a full 48 hours, especially in cities where the majority of retail establishments close in the afternoon at the same time as the factory.

PUBLICATIONS
OF THE
NATIONAL INDUSTRIAL CONFERENCE BOARD

RESEARCH REPORTS

- Research Report No. 1.* WORKMEN'S COMPENSATION ACTS IN THE UNITED STATES—THE LEGAL PHASE. 60 pages. April, 1917. Revised, August, 1919. \$1.00.
- Research Report No. 2.* ANALYSIS OF BRITISH WARTIME REPORTS ON HOURS OF WORK AS RELATED TO OUTPUT AND FATIGUE. 58 pages. November, 1917. \$1.00.
- Research Report No. 3.* STRIKES IN AMERICAN INDUSTRY IN WARTIME. 20 pages. March, 1918. 50 cents.
- Research Report No. 4.* HOURS OF WORK AS RELATED TO OUTPUT AND HEALTH OF WORKERS—COTTON MANUFACTURING. 64 pages. March, 1918. \$1.00.
- Research Report No. 5.* THE CANADIAN INDUSTRIAL DISPUTES INVESTIGATION ACT. 28 pages. April, 1918. 50 cents.
- Research Report No. 6.* SICKNESS INSURANCE OR SICKNESS PREVENTION? 24 pages. May, 1918. 50 cents.
- Research Report No. 7.* HOURS OF WORK AS RELATED TO OUTPUT AND HEALTH OF WORKERS—BOOT AND SHOE INDUSTRY. 76 pages. June, 1918. \$1.00.
- Research Report No. 8.* WARTIME EMPLOYMENT OF WOMEN IN THE METAL TRADES. 80 pages. July, 1918. \$1.00.
- Research Report No. 9.* WARTIME CHANGES IN THE COST OF LIVING—JULY, 1914, TO JUNE, 1918. 82 pages. August, 1918. \$1.00.
- Research Report No. 10.* ARBITRATION AND WAGE-FIXING IN AUSTRALIA. 52 pages. October, 1918. \$1.00.
- Research Report No. 11.* THE EIGHT-HOUR DAY DEFINED. 12 pages. December, 1918. 50 cents.
- Research Report No. 12.* HOURS OF WORK AS RELATED TO OUTPUT AND HEALTH OF WORKERS—WOOL MANUFACTURING. 69 pages. December, 1918. \$1.00.
- Research Report No. 13.* REST PERIODS FOR INDUSTRIAL WORKERS. 55 pages. January, 1919. \$1.00.
- Research Report No. 14.* WARTIME CHANGES IN THE COST OF LIVING—JULY, 1914, TO NOVEMBER, 1918. 33 pages. February, 1919. 75 cents.
- Research Report No. 15.* PROBLEMS OF INDUSTRIAL READJUSTMENT IN THE UNITED STATES. 58 pages. February, 1919. \$1.00.
- Research Report No. 16.* HOURS OF WORK AS RELATED TO OUTPUT AND HEALTH OF WORKERS—SILK MANUFACTURING. 54 pages. March, 1919. \$1.00.
- Research Report No. 17.* WARTIME CHANGES IN THE COST OF LIVING—JULY, 1914, TO MARCH, 1919. 31 pages. May, 1919. 75 cents.
- Research Report No. 18.* HOURS OF WORK AS RELATED TO OUTPUT AND HEALTH OF WORKERS—METAL MANUFACTURING INDUSTRIES. 62 pages. July, 1919. \$1.00.
- Research Report No. 19.* CHANGES IN THE COST OF LIVING—JULY, 1914, TO JULY, 1919. 31 pages. September, 1919. 75 cents.
- Research Report No. 20.* WARTIME CHANGES IN WAGES—SEPTEMBER, 1914, TO MARCH, 1919. 128 pages. September, 1919. \$1.50.
- Research Report No. 21.* WORKS COUNCILS IN THE UNITED STATES. 135 pages. October, 1919. \$1.50.
- Research Report No. 22.* THE COST OF LIVING AMONG WAGE-EARNERS—FALL RIVER, MASSACHUSETTS, OCTOBER, 1919. 18 pages. November, 1919. 50 cents.
- Research Report No. 23.* CONCILIATION AND ARBITRATION IN NEW ZEALAND. 46 pages. December, 1919. \$1.00.
- Research Report No. 24.* THE COST OF LIVING AMONG WAGE-EARNERS—LAWRENCE, MASSACHUSETTS, NOVEMBER, 1919. 21 pages. December, 1919. 50 cents.
- Research Report No. 25.* CHANGES IN THE COST OF LIVING—JULY, 1914, TO NOVEMBER, 1919. 24 pages. December, 1919. 75 cents.
- Research Report No. 26.* A WORKS COUNCIL MANUAL. 32 pages. February, 1920. \$1.00.
- Research Report No. 27.* THE HOURS OF WORK PROBLEM IN FIVE MAJOR INDUSTRIES. 91 pages. March, 1920. \$1.00.
- Research Report No. 28.* CHANGES IN THE COST OF LIVING—JULY, 1914, TO MARCH, 1920. 24 pages. May, 1920. 75 cents.
- Research Report No. 29.* PRACTICAL EXPERIENCE WITH PROFIT-SHARING IN INDUSTRIAL ESTABLISHMENTS. 86 pages. June, 1920. \$1.00.
- Research Report No. 30.* CHANGES IN THE COST OF LIVING—JULY, 1914, TO JULY, 1920. 28 pages. September, 1920. 75 cents.

PUBLICATIONS—continued

- Research Report No. 31.* CHANGES IN WAGES DURING AND SINCE THE WAR—SEPTEMBER, 1914, TO MARCH, 1920. 54 pages. September, 1920. \$1.00.
Research Report No. 32. PRACTICAL EXPERIENCE WITH THE WORK WEEK OF FORTY-EIGHT HOURS OR LESS. 96 pages. December, 1920. \$1.00.
Research Report No. 33. CHANGES IN THE COST OF LIVING—JULY, 1914, TO NOVEMBER, 1920. 29 pages. December, 1920. 75 cents.
Research Report No. 34. HEALTH SERVICE IN INDUSTRY. 72 pages. January, 1921. \$1.00.

SPECIAL REPORTS

- Special Report No. 1.* A CASE OF FEDERAL PROPAGANDA IN OUR PUBLIC SCHOOLS. 13 pages. February, 1919. 50 cents.
Special Report No. 2. WAR REVENUE ACT OF 1918 (A BRIEF ANALYSIS). 18 pages. March, 1919. 50 cents.
Special Report No. 3. INTERIM REPORT OF THE EUROPEAN COMMISSION OF THE NATIONAL INDUSTRIAL CONFERENCE BOARD. 34 pages. July, 1919. 50 cents.
Special Report No. 4. IS COMPULSORY HEALTH INSURANCE DESIRABLE? 12 pages. October 1919. 50 cents.
Special Report No. 5. VITAL ISSUES IN THE INDUSTRIAL CONFERENCE AT WASHINGTON, D. C. 15 pages. November, 1919. 50 cents.
Special Report No. 6. PROBLEMS OF LABOR AND INDUSTRY IN GREAT BRITAIN, FRANCE, AND ITALY. REPORT OF THE EUROPEAN COMMISSION. 406 pages. November, 1919. \$2.50.
Special Report No. 7. THE COST OF LIVING AMONG WAGE-EARNERS—NORTH HUDSON COUNTY, NEW JERSEY, JANUARY, 1920. 20 pages. March, 1920. 50 cents.
Special Report No. 8. THE COST OF LIVING AMONG WAGE-EARNERS—GREENVILLE AND PELZER, SOUTH CAROLINA, AND CHARLOTTE, NORTH CAROLINA, JANUARY AND FEBRUARY, 1920. 25 pages. May, 1920. 50 cents.
Special Report No. 9. PROCEEDINGS OF THE NATIONAL INDUSTRIAL TAX CONFERENCE AT CHICAGO, ILLINOIS, APRIL 16, 1920. 113 pages. May, 1920. \$1.00.
Special Report No. 10. SHOULD TRADE UNIONS AND EMPLOYERS' ASSOCIATIONS BE MADE LEGALLY RESPONSIBLE? 35 pages. June, 1920. 75 cents.
Special Report No. 11. THE CLOSED UNION SHOP VERSUS THE OPEN SHOP: THEIR SOCIAL AND ECONOMIC VALUE COMPARED. 27 pages. July, 1920. 75 cents.
Special Report No. 12. SHOULD THE STATE INTERFERE IN THE DETERMINATION OF WAGE RATES? 150 pages. August, 1920. \$1.50.
Special Report No. 13. THE COST OF LIVING AMONG WAGE-EARNERS—CINCINNATI, OHIO, MAY, 1920. 18 pages. July, 1920. 50 cents.
Special Report No. 14. UNWARRANTED CONCLUSIONS REGARDING THE EIGHT-HOUR AND TEN-HOUR WORKDAY. 21 pages. August, 1920. 50 cents.
Special Report No. 15. PROBLEMS OF LABOR AND INDUSTRY IN GERMANY. 65 pages. September, 1920. \$1.00.
Special Report No. 16. THE COST OF LIVING AMONG WAGE-EARNERS—WORCESTER, MASSACHUSETTS, JUNE, 1920. 20 pages. October, 1920. 50 cents.
Special Report No. 17. PROCEEDINGS OF THE SECOND NATIONAL INDUSTRIAL TAX CONFERENCE, NEW YORK, OCTOBER 22 AND 23, 1920. 200 pages. November, 1920. \$1.50.
Special Report No. 18. REPORT OF THE TAX COMMITTEE OF THE NATIONAL INDUSTRIAL CONFERENCE BOARD, ON THE FEDERAL TAX PROBLEM. 58 pages. December, 1920. 75 cents.

INDUSTRIAL NEWS SURVEY

Important *industrial* news in concise form.
A Digest of Industrial News and Comment
as Published in Reliable Newspapers, Magazines, Reviews, Special Articles, and Government Documents.

Weekly.

\$2.00 per year

HB31.N3 no.32



3 2106 00080 9795

THE UNIVERSITY LIBRARY
UNIVERSITY OF CALIFORNIA, SANTA CRUZ

This book is due on the last **DATE** stamped below.
To renew by phone, call **459-2756**
Books not returned or renewed within 14 days
after due date are subject to billing.

NOV 12 2003 REC'D

